Southeastern North Carolina Regional Hazard Mitigation Plan

Submitted by **ESP Associates, Inc.**

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SECTION 1
INTRODUCTION

This section provides a general introduction to the Southeastern NC Regional Hazard Mitigation Plan. It consists of the following five subsections:

- 1.1 Background
- 1.2 Purpose
- 1.3 Scope
- 1.4 Authority
- 1.5 Summary of Plan Contents

1.1 BACKGROUND

Natural hazards, such as floods, hurricanes, and wildfires are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. We must consider these hazards to be legitimate and significant threats to human life, safety and property.

The Southeastern NC Region is located in the coastal plain and coastal areas of southeastern North Carolina and includes the counties of Brunswick, New Hanover, Onslow and Pender. This region is vulnerable to a wide range of natural hazards such as hurricanes, flooding, severe thunderstorms, and wildfires. It is also vulnerable to human-caused hazards, including chemical releases, hazardous material spills, and infectious disease. These hazards threaten the life and safety of residents and visitors in the Southeastern NC Region, and have the potential to damage or destroy both public and private property, disrupt the local economy and impact the overall quality of life of individuals who live, work, and vacation in the Southeastern NC Region.

While the threat from hazardous events may never be fully eliminated, there is much we can do to lessen their potential impact upon our community and our citizens. By minimizing the impact of hazards upon our built environment, we can prevent such events from resulting in disasters. The concept and practice of reducing risks to people and property from known hazards is generally referred to as *hazard mitigation*.

FEMA Definition of Hazard Mitigation:

"Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."

Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the

foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

A key component in the formulation of a comprehensive approach to hazard mitigation is to develop, adopt, and update as needed a local hazard mitigation plan. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

Brunswick, New Hanover and Pender counties first joined together in 2015 to develop the initial version of this plan. Prior to that, each County was operating under individual County-level hazard mitigation plans. Onslow County and participating municipalities in the County joined this plan for the 2021 update. The process followed to update the plan is detailed in Section 2: Planning Process.

This plan documents the region's sustained efforts to incorporate hazard mitigation principles and practices into routine government activities and functions. At its core, the plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk. These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting and acquisition projects. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to more holistically reduce the Southeastern NC Region's vulnerability to identified hazards. The plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

1.1.1 The Disaster Mitigation Act and the Flood Insurance Reform Acts

In an effort to reduce the Nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state, local and Tribal government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local or Tribal government applying for federal mitigation grant funds. In short, if a jurisdiction is not covered by an approved mitigation plan, it will not be eligible for mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) program, both of which are administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security. Communities with an adopted and federally-approved hazard mitigation plan thereby become prepositioned and more apt to receive available mitigation funds before and after the next disaster strikes.

Major federal flood insurance legislation was passed in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141) and the subsequent Homeowner Flood Insurance Affordability Act (HFIAA) in 2014 which revised Biggert-Waters. HFIAA established the requirement that a FEMA-approved Hazard Mitigation Plan is now required if communities wish to be eligible for any of the FEMA mitigation programs. These acts made several changes to the way the National Flood Insurance Program is to be run, including raises in rates to reflect true flood risk and changes in how Flood Insurance Rate Map (FIRM) updates impact policyholders. These acts further emphasize Congress' focus on mitigating vulnerable structures.

The Southeastern NC Regional Hazard Mitigation Plan has been prepared in coordination with FEMA Region IV and the North Carolina Division of Emergency Management (NCEM) to ensure that the Plan meets all applicable FEMA and state requirements for hazard mitigation plans. A *Local Mitigation Plan Review Tool*, found in Appendix C, provides a summary of federal and state minimum standards and notes the location where each requirement is met within the Plan. Additionally, the plan was developed in accordance with updated FEMA Region IV Review Standards that were provided in February of 2020.

1.2 PURPOSE

The purposes of the Southeastern NC Regional Hazard Mitigation Plan are to:

- Completely update the existing Southeastern NC Regional Hazard Mitigation Plan to demonstrate progress and reflect current conditions;
- Integrate Onslow County and the municipalities in the County into the Southeastern NC Regional Hazard Mitigation Plan;
- Increase public awareness and education;
- Maintain grant eligibility for participating jurisdictions;
- Update the plan in accordance with Community Rating System (CRS) requirements, where applicable; and
- Maintain compliance with state and federal legislative requirements for local hazard mitigation plans.

1.3 SCOPE

The focus of the Southeastern NC Regional Hazard Mitigation Plan is on those hazards determined to be "high" or "moderate" risks to the Southeastern NC Region, as determined through a detailed hazard risk assessment. Other hazards that pose a "low" or "negligible" risk will continue to be evaluated during future updates to the Plan, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the participating counties to prioritize mitigation actions based on those hazards which are understood to present the greatest risk to lives and property.

The geographic scope (i.e., the planning area) for the Plan includes the Counties of Brunswick, New Hanover, Onslow and Pender as well as their incorporated jurisdictions. **Table 1.1** lists each of these counties and their participating jurisdictions.

TABLE 1.1: PARTICIPATING JURISDICTIONS IN THE SOUTHEASTERN NC REGIONAL HAZARD MITIGATION PLAN

Brunswick County	
Bald Head Island	Northwest
Belville	Oak Island
Boiling Spring Lakes	Ocean Isle Beach
Bolivia	Sandy Creek
Calabash	Shallotte
Carolina Shores	Southport
Caswell Beach	St. James
Holden Beach	Sunset Beach
Leland	Varnamtown
Navassa	
New Hanover County	
Carolina Beach	Wilmington
Kure Beach	Wrightsville Beach
Onslow County	
Jacksonville	Richlands
Holly Ridge	Swansboro
North Topsail Beach	
Pender County	
Atkinson	Surf City
Burgaw	Topsail Beach
Saint Helena	Watha

1.4 AUTHORITY

The Southeastern NC Regional Hazard Mitigation Plan has been developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans and has been adopted by each participating jurisdiction in accordance with standard local procedures. Copies of the adoption resolutions for each participating jurisdiction are provided in Appendix A. The Plan shall be routinely monitored and revised to maintain compliance with the following provisions, rules, and legislation:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390);
- FEMA's Final Rule published in the Federal Register, at 44 CFR Part 201 (201.6 for local mitigation planning requirements and 201.7 for Tribal planning requirements);
- Flood Insurance Reform Act of 2004 (P.L. 108-264), Biggert-Waters Flood Insurance Reform Act of 2012 (P.L. 112-141) and the Homeowner Flood Insurance Affordability Act of 2014.

1.5 SUMMARY OF PLAN CONTENTS

The contents of this Plan are designed and organized to be as reader-friendly and functional as possible. While significant background information is included on the processes used and studies completed (i.e., risk assessment, capability assessment), this information is separated from the more meaningful planning outcomes or actions (i.e., mitigation strategy, mitigation action plan).

Section 2: ***Planning Process***, provides a complete narrative description of the process used to prepare the Plan. This includes the identification of participants on the planning team, and how the public and other stakeholders were involved. It also includes a detailed summary for each of the key meetings held, along with any associated outcomes.

The ***Community Profile***, located in Section 3, provides a general overview of the Southeastern NC Region, including prevalent geographic, demographic and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information provides a snapshot of the planning area and helps local officials recognize those social, environmental and economic factors that ultimately play a role in determining the region's vulnerability to hazards.

The Risk Assessment is presented in three sections: Section 4: ***Hazard Identification***; Section 5: ***Hazard Profiles***; and Section 6: ***Vulnerability Assessment***. Together, these sections serve to identify, analyze and assess hazards that pose a threat to the Southeastern NC Region. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of the Southeastern NC Region.

The Risk Assessment begins by identifying hazards that threaten the Southeastern NC Region. Next, detailed profiles are established for each hazard, building on available historical data from past hazard occurrences, spatial extent, and probability of future occurrence. This section culminates in a hazard risk ranking based on conclusions regarding the frequency of occurrence, spatial extent, and potential impact highlighted in each of the hazard profiles. In the vulnerability assessment, NCEM's Risk Management section's loss estimation methodology is used to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as participating jurisdictions in the Southeastern NC Region seek to determine the most appropriate mitigation actions to pursue and implement—enabling it to prioritize and focus its efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The ***Capability Assessment***, found in Section 7, provides a comprehensive examination of the capacity of the participating jurisdictions in the Southeastern NC Region to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of detailed survey questionnaires for local officials and an inventory and analysis of existing plans, ordinances and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses or conflicts in programs or activities that may hinder mitigation efforts, and to identify those activities that should be built upon in establishing a successful and sustainable local hazard mitigation program.

The *Community Profile*, *Risk Assessment*, and *Capability Assessment* collectively serve as a basis for determining the goals for the Southeastern NC Regional Hazard Mitigation Plan, each contributing to the development, adoption and implementation of a meaningful and manageable *Mitigation Strategy* that is based on accurate background information.

The ***Mitigation Strategy***, found in Section 8, consists of broad hazard mitigation goal statements for the region as well as an analysis of hazard mitigation techniques for the Southeastern NC Region to consider in reducing hazard vulnerabilities. The strategy provides the foundation for a detailed ***Mitigation Action***

Plan, found in Section 9, which links specific mitigation actions for each county department or agency to locally-assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan both strategic, through the identification of long-term goals, and functional, through the identification of immediate and short-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the Southeastern NC Region less vulnerable to the damaging forces of hazards while improving the economic, social and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link, where possible, hazard mitigation policies and programs with complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

Plan Maintenance, found in Section 10, includes the measures that the Southeastern NC Region will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

SECTION 2
PLANNING PROCESS

This section describes the planning process undertaken to develop the 2021 update of the Southeastern NC Regional Hazard Mitigation Plan.

This section consists of the following nine subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 History of Hazard Mitigation Planning in the Southeastern NC Region
- 2.3 Updating the Plan in 2020/2021
- 2.4 The Southeastern NC Regional Hazard Mitigation Planning Committee
- 2.5 Community Meetings and Workshops
- 2.6 Involving the Public
- 2.7 Involving the Stakeholders
- 2.8 Documentation of Plan Progress
- 2.9 Southeastern NC Region CRS Planning Process Documentation

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44 CFR Requirement

44 CFR Part 201.6(c)(1): The plan shall include documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process and how the public was involved.

2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term community vision.

To ensure the functionality of a hazard mitigation plan, responsibility is assigned for each proposed mitigation action to a specific individual, department, or agency along with a schedule or target completion date for its implementation (see Section 9: *Mitigation Action Plans*). Plan maintenance procedures are established for the routine monitoring of implementation progress, as well as the evaluation and enhancement of the mitigation plan itself. These plan maintenance procedures ensure that the Plan remains a current, dynamic, and effective planning document over time that becomes integrated into the routine local decision-making process (see Section 10: *Plan Maintenance*).

Communities that participate in hazard mitigation planning have the potential to accomplish many benefits, including:

- saving lives and property,
- saving money,
- speeding recovery following disasters,

- reducing future vulnerability through wise development and post-disaster recovery and reconstruction,
- expediting the receipt of pre-disaster and post-disaster grant funding, and
- demonstrating a firm commitment to improving community health and safety.

Typically, mitigation planning is described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond solely reducing hazard vulnerability. Mitigation measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing community goals or initiatives that will help complement or hinder their future implementation.

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE SOUTHEASTERN NC REGION

Prior to the development of the initial Southeastern NC Regional Hazard Mitigation Plan in 2016, each of the three counties and jurisdictions that originally participated in the regional plan (Brunswick, New Hanover and Pender Counties) had previously adopted separate county-level hazard mitigation plans. Each of the county-levels plans was developed using the multi-jurisdictional planning process recommended by the Federal Emergency Management Agency (FEMA).

For the development of the original regional plan, the aforementioned three counties, and a handful of municipalities that were maintaining their own separate plans, joined to develop the Southeastern NC Regional Hazard Mitigation Plan. The regional plan was developed in order to simplify planning efforts for the jurisdictions in the Southeastern NC Region and allowed resources to be shared amongst the participating jurisdictions to ease the administrative duties of all of the participants by combining the three existing County-level plans and a few municipal plans into one multi-jurisdictional plan. The 2016 plan was an important and successful first start for regional hazard mitigation planning efforts and that success has carried over into the 2020 update of the plan.

For the 2021 update, Onslow County and the municipalities within the County joined the Southeastern NC Regional Hazard Mitigation Plan. Until this update of the regional plan, Onslow County has had a separate plan for the County and the municipal jurisdictions within the County.

2.3 UPDATING THE PLAN IN 2020/2021

FEMA requires that hazard mitigation plans be updated every five years to remain eligible for federal mitigation and public assistance funding. To prepare the 2021 *Southeastern NC Regional Hazard Mitigation Plan*, ESP Associates, Inc. was hired by North Carolina Emergency Management to provide professional mitigation planning services for the plan update effort. Per the contractual scope of work, the consultant team followed the mitigation planning process recommended by FEMA (Publication Series 386 and Local Mitigation Plan Review Guide) and recommendations provided by North Carolina Emergency Management (NCEM) mitigation planning staff[1]. Additionally, for the 2020 update, FEMA Community Rating System (CRS) and Community Wildfire Protection Plan (CWPP) requirements were integrated into the plan update.

Tables 2.1 and 2.2 below provide an overview of how the Community Rating System and Community Wildfire Protection Plan requirements were integrated into this plan update.

TABLE 2.1 FEMA HAZARD MITIGATION PLANNING REQUIREMENTS AND THE CRS 10-STEP PLANNING PROCESS REFERENCE TABLE

FEMA Disaster Mitigation Act Requirement	CRS Activity 510 Planning Requirement
Phase I – Planning Process	
§201.6(c)(1)	Step 1: Organize to Prepare the Plan
§201.6(b)(1)	Step 2: Involve the Public
§201.6(b)(2) & (3)	Step 3: Coordinate
Phase II – Risk Assessment	
§201.6(c)(2)(i)	Step 4: Assess the Hazard
§201.6(c)(2)(ii) & (iii)	Step 5: Assess the Problem
Phase III – Mitigation Strategy	
§201.6(c)(3)(i)	Step 6: Set Goals
§201.6(c)(3)(ii)	Step 7: Review Possible Activities
§201.6(c)(3)(iii)	Step 8: Draft an Action Plan
Phase IV – Plan Maintenance	
§201.6(c)(5)	Step 9: Adopt the Plan
§201.6(c)(4)	Step 10: Implement, Evaluate and Revise the Plan

TABLE 2.2 COMMUNITY WILDFIRE PROTECTION PLAN PROCESS INTEGRATION REFERENCE TABLE

CWPP Process	Hazard Mitigation Plan Integration Reference
Step 1: Convene Decisionmakers	Section 2: Planning Process
Step 2: Involve Federal Agencies	Section 2: Planning Process
Step 3: Engage Interested Parties	Section 2: Planning Process
Step 4: Establish a Community Base Map	Section 3: Community Profile
Step 5: Develop a Community Risk Assessment	Sections 4, 5 and 6: Hazard Identification, Hazard Profiles and Vulnerability Assessment Section 7: Capability Assessment

[1] A copy of the negotiated contractual scope of work between NCEM and ESP is available through NCEM upon request.

CWPP Process	Hazard Mitigation Plan Integration Reference
Step 6: Establish Community Hazard Reduction Priorities and Recommendations to Reduce Structural Ignitability	Section 8: Mitigation Strategy
Step 7: Develop an Action Plan and Assessment Strategy	Section 9: Mitigation Action Plans Section 10: Plan Maintenance
Step 8: Finalize the CWPP	Appendix A: Plan Adoption

Source: Preparing a Community Wildfire Protection Plan – A Handbook for Wildland-Urban Interface Communities

The Local Mitigation Plan Review Tool, found in Appendix C, provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this Plan. These standards are based upon FEMA's Final Rule as published in the Federal Register in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's Local Mitigation Plan Review Guide (October 2011) for reference as they completed the Plan.

For the development of the 2021 plan, all of the aforementioned jurisdictions that participated in the development of the previous regional plan participated in this plan's development and Onslow County and the municipalities within the County agreed to join the regional plan. None of the previous participating jurisdictions have been removed from the plan.

The process used to prepare this Plan included twelve major steps that were completed over the course of approximately nine months beginning in July 2019. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*.

FIGURE 2.1: MITIGATION PLANNING PROCESS FOR THE SOUTHEASTERN NC REGION

2.4 THE SOUTHEASTERN NC REGIONAL HAZARD MITIGATION PLANNING COMMITTEE

In order to guide the initial development of this Plan and this subsequent update, the participating jurisdictions created the Southeastern NC Regional Hazard Mitigation Planning Committee. The Regional Hazard Mitigation Committee represents a community-based planning team made up of representatives from various county departments, municipalities, and other key stakeholders identified to serve as critical partners in the planning process.

Beginning in July 2019, the Regional Hazard Mitigation Planning Committee members engaged in regular discussions as well as local meetings and planning workshops to discuss and complete tasks associated with preparing the Plan. This working group coordinated on all aspects of plan preparation and provided valuable input to the process. In addition to regular meetings, committee members routinely communicated and were kept informed through an e-mail distribution list.

Specifically, the tasks assigned to the Regional Hazard Mitigation Planning Committee members included:

- participate in Regional Hazard Mitigation Planning Committee meetings and workshops
- provide best available data as required for the risk assessment portion of the Plan
- help update the Capability Assessment section of the plan and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan
- support the update of the Mitigation Strategy, including the review, update and adoption of regional goal statements
- help update existing mitigation actions and design and propose any appropriate new mitigation actions for their department/agency for incorporation into the Mitigation Action Plan
- review and provide timely comments on all study findings and draft plan deliverables
- support the adoption of the 2021 *Southeastern NC Regional Hazard Mitigation Plan*

Table 2.3 lists the members of the Regional Hazard Mitigation Planning Committee who were responsible for participating in the development of the Plan.

TABLE 2.3: MEMBERS OF THE SOUTHEASTERN NC REGIONAL HAZARD MITIGATION PLANNING COMMITTEE

NAME	DEPARTMENT / AGENCY / TITLE
Brunswick County*	
Garner, Scott	Emergency Services/Fire Marshal, Deputy Director
Hackney, Brandon	Planning, Project Planner
Pages, Marc	Planning, Senior Planner
Shirk, John	Floodplain Management, Floodplain Manager
Bald Head Island	
Boyett, Stephen	Village Building Inspector/Floodplain Manager
Belville	
Hewlett, Brenda	Administrative Support Specialist
Page, Cheryl	Finance Clerk
Boiling Spring Lakes	
Morgan, Nicole	Planning and Zoning Administrator/Floodplain Manager
Mack, Michael	Public Works Director
Lathrop, Bill	Code Enforcement Officer
Calabash	
Nance, Charles	Town Administrator
Carolina Shores	
Wood, Sandy	Inspections and Construction Superintendent
Caswell Beach*	
Hicks, Chad	Town Administrator
Holden Beach*	
Evans, Timothy Dale	Planning and Inspections Director
Wooten, Rhonda	CAMA/Zoning Official
Leland	
Andrea, Ben	Planning and Inspections Director
Grimes, John	Fire/Rescue/EMS Chief
Hayes, Ronnie	Fire/Rescue/EMS Deputy Chief

NAME	DEPARTMENT / AGENCY / TITLE
Navassa	
Sutton, Barnes	Planning and Development Director
Oak Island*	
Edwards, Steve	Development Services Director
Kelly, David	Town Manager
Vares, Jake	Planning and Zoning Administrator
Ocean Isle Beach*	
Dycus, Keith	Development Services Specialist
Whiteside, Justin	Assistant Town Administrator
Shallotte	
Waring, Robert	Assistant Town Manager
Southport*	
Lloyd, Thomas	City Planner
St. James	
Dickie, James	Town Manager
Sunset Beach*	
Rademacher, Todd	Planning Director
New Hanover County*	
Still, Steven	Emergency Management Director
Skinner, Kristen	Emergency Management Specialist
McRay, Anna	Emergency Management Deputy Director
Oelslager, Kate	Communications and Outreach Coordinator
Griffin, Heather	SHPR/NHRMC
Iannucci, Jim	Engineering
Howard, David	HHS Public Health and Safety
Spencer, Dave	New Hanover County Schools
Brown, Lisa	Brunswick and New Hanover Public Health
Cottle, Deborah	New Hanover County 911
Ellis, Bruce	New Hanover County WebEOC Coordinator
Guendner, Rosemary	New Hanover County EM (MPA Fellow)
Baldwin, Eliza	Strategy Analyst
Loeper, Jessica	Chief Communications Officer
Meyer, Frank	New Hanover County Fire
Smith, Jennifer	New Hanover County Fire
Davis, Matt	New Hanover County Fire
Wayne, Martha	Deputy Chief Financial Officer
Roth, Rebecca	Long Range Planning, Senior Planner
Vafier, Ken	Planning Manager
Evers, Brian	New Hanover County Sheriff's Office
Carolina Beach *	
Murphy, Miles	Planner
Abbotts, Gloria	Graduate Fellow
Wilmington	
Vincent, Natosha	Wilmington Fire Department
Mason, Steve	Wilmington Fire Department

NAME	DEPARTMENT / AGENCY / TITLE
Martinette, Buddy	Wilmington Fire Department
Harris, Craig	Wilmington Planning
Kennedy, Benjamin	Wilmington Police Department
Oyler, David	Wilmington Police Department
Wrightsville Beach*	
Welsh, Trevor	Building Inspector
Pender County	
Henley, Travis	Senior Planner
Shore, Sam	Planner II Long Range Planner
Adams, Daniel	Floodplain Manager
Breuer, Kyle	Planning Director (Former)
Woodruff, Randell	County Manager (Former)
Burgaw	
Correll, Andrea	Planning Director
Surf City	
Batts, Teresa	
Horne, James	Emergency Management Director
Topsail Beach	
Rose, Michael	Town Manager
Vescovi, Linda	Planning Director
Onslow County*	
Bryson, Norman	Emergency Management, Director
Miles, Stacie	Emergency Management, Deputy Director
Rhue, Jessica	Planning Director
George, Shawn	Sheriff's Office
Turner, Kevin	Appraisal Supervisor
Hagopien, Angelica	GIS Specialist
Warren, Ben	Assistant County Manager
Holland, Jane	GIS Specialist
Myers, Steve	Onslow County Schools
Pike, Patricia	GIS Director
Davis, Charles	Deputy Director
Holly Ridge	
McFann, Mike	Public Works Director
Morrison, Kenneth	Building Inspections Director
Jacksonville*	
Hayes, Shaun	Jacksonville Fire, Assistant Fire Chief
Tallman, Tee	Jacksonville Fire, Fire Chief
Procopio, Amy	Jacksonville Fire, Battalion Chief
Massey, Ron	Deputy City Manager
North Topsail Beach*	
Hill, Deb	Planning Director
Richlands	
Whitehead, Gregg	Town Administrator
Swansboro	

NAME	DEPARTMENT / AGENCY / TITLE
Ansell, Jessica	Planner
Seaberg, Chris	Town Manager
Southeastern NC Regional CRS Steering Committee	
Sylvia, Lynn	Cape Fear Community College
Buschfort, Erin	WH
Carr, Paul	NHRMC
Kasulis, Aaron	NHREMS
Brown, Warren	NHREMS
Streba, Catrina	NHRMC EM
Hart, Audrey	New Hanover Disaster Coalition
Moran, Will	USCG
Brunetti, Jayna	USCG
Johnson, Thomas	USCG
Hatcher, Eric	CFPUA
Eckert, Beth	CFPUA
Edwards, Hans	Southeastern Healthcare Preparedness Region
Reyes, Frances	Harrelson Center/HelpHub/NHDC
Venters, Mark	GE-Hitachi Nuclear
Taylor, Tommy	United Way CFA
White, Chris	Onslow County Albert J Ellis Airport
Harpinea, Annette	Coastal Carolina Community College
Fullerton, John	Water Resources Private Consultant
Peterson, Ginny	New Hanover Disaster Coalition
Register, Stan	State of NC – Fort Fisher
Ruskin, Jodie	UNCW
Thompson, Michael	American Red Cross
Garner, Scott	Emergency Services/Fire Marshal, Deputy Director – Brunswick County
Shirk, John	Floodplain Manager – Brunswick County
Evans, Timothy Dale	Planning and Inspections Director – Holden Beach
Wooten, Rhonda	CAMA/Zoning Official – Holden Beach
Edwards, Steve	Development Services Director – Oak Island
Kelly, David	Town Manager – Oak Island
Dycus, Keith	Development Services Specialist – Ocean Isle Beach
Whiteside, Justin	Assistant Town Administrator – Ocean Isle Beach
McRay, Anna	Emergency Management Deputy Director – New Hanover County
Vafier, Ken	Planning Manager – New Hanover County
Murphy, Miles	Planner – Carolina Beach
Abbotts, Gloria	Graduate Fellow – Carolina Beach
Miles, Stacie	Emergency Management, Deputy Director – Onslow County
Rhue, Jessica	Planning Director – Onslow County
Lloyd, Thomas	City Planner - Southport

*Indicates CRS Communities

Table 2.4 lists points of contact for several of the jurisdictions who elected to designate their respective county officials to represent their jurisdiction on the planning team, generally because they did not have the time or staff to be able to attend on their own. Although these members designated county officials to represent them at in-person meetings, each was still contacted throughout the planning process and participated by providing suggestions and comments on the Plan, updates to mitigation actions and the Capability Assessment via email and phone conversations. These members are listed below by municipality.

TABLE 2.4: MEMBERS DESIGNATING REPRESENTATIVES TO THE SOUTHEASTERN NC REGIONAL HAZARD MITIGATION PLANNING TEAM

NAME	DEPARTMENT / AGENCY / TITLE
Brunswick County	
Marston, Ella Jane	Mayor, Bolivia
Strickland, Donna	City Clerk, Northwest
Evans, Marion	Town Clerk, Sandy Creek
Kirby, William S.	Mayor, Varnamtown
New Hanover County	
Sanders, Mandy	Town Clerk, Kure Beach*
Pender County	
	Atkinson
	Burgaw
	St. Helena
	Topsail Beach*
	Watha

*Indicates CRS community

Additional participation and input from other identified stakeholders and the general public was sought by the participating counties during the planning process through phone calls and the distribution of emails, advertisements and public notices aimed at informing people on the status of the Hazard Mitigation Plan (public and stakeholder involvement is further discussed later in this section).

2.4.1 Multi-Jurisdictional Participation

The Southeastern NC Regional Hazard Mitigation Plan includes four counties and thirty-four incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each county and its participating jurisdictions were required to perform the following tasks:

- Participate in mitigation planning workshops;
- Identify completed mitigation projects, if applicable; and
- Develop (and/or update) and adopt their local Mitigation Action Plan.

Each jurisdiction participated in the planning process and has developed a local Mitigation Action Plan unique to their jurisdiction. This provides the means for jurisdictions to monitor and update their Plan on a regular basis.

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of this Plan required a series of meetings and workshops for facilitating discussion, gaining consensus and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the Plan.

The following is a summary of the key meetings and community workshops held during the development of the plan update.[2] In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency, such as the approval of specific mitigation actions for their department or agency to undertake and include in the Mitigation Action Plan.

2.5.1 Meeting Minutes

Meeting Minutes from Internal Kickoff Conference Call/Skype Meeting with County Leads and NCEM Representatives
July 9, 2019
Phone Call/Skype Meeting

Nathan Slaughter, Hazard Mitigation Department Manager from ESP Associates, Inc. and Project Manager for the update of the Southeastern NC Regional Hazard Mitigation Plan, began the meeting by welcoming the attendees and giving a brief overview of the project and the purpose of the meeting.

Mr. Slaughter recognized all of the participating counties and members from NCEM and FEMA. All counties were represented. Mr. Slaughter then explained new project information, which included funding and grant information, the addition of Onslow County to the region, and that there was no local match requirement for this update.

Next, Mr. Slaughter gave a brief mitigation refresher and reviewed both the Disaster Mitigation Act of 2000 and NC Senate Bill 300. He explained two ways of how we should think about mitigation: we want to mitigate hazard impacts of existing development in the community (houses, businesses, critical facilities, etc.), and ensure that future development is conducted in a way that doesn't increase vulnerability. He also introduced the six hazard mitigation techniques and provided examples of each. The key objectives of the update were shared: coordinate between four counties; update the plan to demonstrate progress and reflect current conditions; increase public education and awareness; maintain grant eligibility for participating jurisdictions; update the plan in accordance with Community Rating System (CRS) requirements; and maintain compliance with State and Federal requirements.

[2] Copies of agendas, sign-in sheets, minutes, and handout materials for all meetings and workshops can be found in Appendix D.

Mr. Slaughter then explained new elements that will be included in this update, such as the NCEM Risk Management Tool, CRS 510 compliance, Risk MAP products, Community Wildfire Protection Plan elements, and the Resilience Assessment.

The elements of the planning process were shared and explained, and the hazards identified in the State of North Carolina Hazard Mitigation Plan were reviewed. Next, the project schedule was shared and the roles and responsibilities of ESP Associates, county leads, and participating jurisdictions were explained in detail.

Finally, Mr. Slaughter gave the group the link to the public survey. The group then discussed the next steps; due to the number of participating communities, all were in agreement to initially hold a regional meeting with all counties, and then to hold individual countywide meetings or follow-up discussions, as needed, to update the mitigation strategy.

Mr. Slaughter thanked everyone for their participation and the call was ended.

Meeting Minutes from Southeastern NC Regional Hazard Mitigation Planning Committee Kickoff Meeting
Cape Fear Community College, Union Station Auditorium
September 18, 2019

Nathan Slaughter, began the meeting by welcoming the attendees and giving a brief overview of the project and the purpose of the meeting.

Mr. Slaughter led the meeting of the Regional Hazard Mitigation Planning Team and began by having attendees introduce themselves by indicating if they were representing County, municipal or other stakeholders. The 79 attendees included representatives from various departments and local jurisdictions within each of the four counties participating in the plan update and a variety of other stakeholders. All four counties were represented. Mr. Slaughter then provided an overview of the items to be discussed at the meeting and briefly reviewed the agenda and presentation slide handouts. He then defined mitigation and gave a review of the Disaster Mitigation Act of 2000 and NC Senate Bill 300.

To continue, Mr. Slaughter provided detailed information about the project. He mentioned that the project is funded by a FEMA HMGP grant, and that NCEM was managing the planning effort and had assigned ESP Associates, Inc. to manage the update. For this update, there was no local funding required.

Mr. Slaughter then explained some of the basic concepts of mitigation. He explained how we should think about mitigation: we want to mitigate hazard impacts of existing development in the community (houses, businesses, critical facilities, etc.), and ensure that future development is conducted in a way that doesn't increase vulnerability. This can be achieved by having good plans, policies, and procedures in place.

Following the overview, Mr. Slaughter led the group in an "icebreaker" exercise to refamiliarize meeting participants with various mitigation techniques. He briefly recapped the six different categories of

mitigation techniques: emergency services, prevention, natural resource protection, structural projects, public education and awareness, and property protection. Each attendee was then given $20 in mock currency and asked to "spend" their mitigation money as they personally deemed appropriate among the six mitigation categories. Money was "spent" by placing it in cups labeled with each of the mitigation techniques. The money was tabulated and it was determined that the most money was spent on prevention.

After the icebreaker exercise, Mr. Slaughter reviewed the key objectives of the project, which are to:

- Coordinate between the four participating counties to update the regional plan
- Update the plan to demonstrate progress and reflect current conditions
- Complete the update before the existing plan expires on April 24, 2021
- Increase public awareness and education
- Maintain grant eligibility for participating jurisdictions
- Update the plan in accordance with Community Rating System (CRS) requirements, and
- Maintain compliance with State and Federal requirements

Next, he explained new elements to this update, which include integrating with NCEM's RMT, Activity 510 compliance for CRS communities, Risk MAP, Community Wildfire Protection Plans, the NC Resilience Assessment, and EMAP compliance.

Mr. Slaughter reviewed the list of participating jurisdictions with the group, which all agreed to participate again. He also explained the planning process and specific tasks to be accomplished for the project, which include the planning process, risk assessment, capability assessment, mitigation strategy, mitigation action plan, and plain maintenance procedures. For the risk assessment portion of the process, Mr. Slaughter asked each county to designate a point of contact to coordinate the gathering of GIS data required for the analysis. He also reviewed the list of identified hazards and the committee agreed to maintain the previous list of hazards for the four counties.

The project schedule was presented and Mr. Slaughter noted that the twelve-month schedule provided ample time to produce a quality plan and meet state and federal deadlines.

Mr. Slaughter discussed what data would need to be collected to complete the project. This includes GIS Data, Capability Assessment Revisions, a Public Participation Survey, and updates to existing Mitigation Actions.

Mr. Slaughter then reviewed the roles and responsibilities of ESP Associates, Inc, the County leads, and the participating jurisdictions. The presentation concluded with a discussion of the next steps to be taken in the project development. He encouraged meeting participants to distribute the Public Participation Survey. The next HMPT meeting was scheduled for some time in February 2020 to discuss the findings of the risk and capability assessments and to begin updating existing mitigation actions and identify new goals.

FIGURE 2.2: SOUTHEASTERN NC KICKOFF MEETING

Meeting Minutes from Mitigation Strategy Meeting
February 11, 2020
New Hanover County Public Library – Northeast Branch
10:00 AM – Noon

Nathan Slaughter, Project Manager from ESP Associates, began the meeting by welcoming the attendees and reviewing the meeting handouts, which included an agenda and a hard copy of the meeting presentation. Mr. Slaughter asked meeting attendees to introduce themselves and gave a refresher on mitigation, why we plan, and the key objectives of the project. He reviewed the participating jurisdictions, project tasks and project schedule. He stated that a draft of the updated Regional Hazard Mitigation Plan would be presented in April 2020.

Mr. Slaughter then presented the findings of the risk assessment. He shared the list of all hazards that are addressed in the regional plan, and reviewed the list of hazards addressed in the North Carolina State Hazard Mitigation Plan. He discussed how the hazards in the regional plan would be revised to align with the hazards in the State Plan. This would include the addition of manmade hazards and technological hazards. He discussed a couple of caveats for the risk assessment and indicated that best

available data was used. While that information is helpful, events are often under-reported, so it is important to keep the end goal in sight. The purpose of the risk assessment was shared: to compare hazards and determine which should be the focus of the mitigation actions. Finally, he mentioned to the stakeholders that it ultimately is their risk assessment, so their recommendations for adjustment are welcomed and encouraged.

Mr. Slaughter stated that since the last plan was updated, there have been four Presidential disaster declarations that have impacted the region, which helped emphasize the need to continue updating the mitigation plan.

The following Hazard Profiles and summaries of each hazard were then shared:

- FLOOD: There have also been 26,243 reported NFIP losses since 1978 and approximately $329 million in claims. There are 1,424 repetitive loss properties, and future occurrences are highly likely.
- HURRICANE AND COASTAL HAZARDS: 127 storm tracks have come within 75 miles of the region since 1850. 93 of those were classified as a hurricane or tropical storm. Future occurrences are likely.
- EROSION: There are two primary types of erosion in the region: coastal and riverine. Beach nourishment and dune stabilization can help mitigate erosion. Future occurrences are likely.
- SEVERE WINTER WEATHER: 31 winter weather events have been reported for the region between 1996-2018. Future occurrences are highly likely.
- EXCESSIVE HEAT: There have been 13 excessive heat events reported in the region between 1996-2019. Future occurrences are likely.
- WILDFIRE: Wildfire is a hazard of concern for the region, which is one of the most at risk areas in the State. Future occurrences are likely.
- DAM FAILURE: Of the 29 dams in the region, 9 are considered high hazard dams. The most serious breach in the region occurred in Boiling Spring Lakes. Future occurrences are unlikely.
- DROUGHT: There were 19 regional drought events between 2000 and 2018, and future occurrences are likely.
- TORNADOES: There have been 131 recorded events since 1950, causing $24,425,250 in property damage. Future occurrences are likely.
- SEVERE THUNDERSTORMS: 280 severe thunderstorm events have been recorded since 1950. These events resulted $890,000 million in property damages. Future occurrences are highly likely.
- HAILSTORM: There have been 536 recorded events since 1950. Future occurrences are likely.
- LIGHTNING: Since 1996, there have been 79 reported occurrences, which resulted in 5 deaths, 16 injuries and nearly $4.8 million dollars in property damage. Future occurrences are highly likely.
- SINKHOLES: There have been a number of reported sinkhole events in the region. Future occurrences are likely.
- EARTHQUAKE: No significant earthquake events have taken place in the region, but future occurrences are possible.
- INFECTIOUS DISEASE: Infectious disease is an unlikely hazard for the region.
- HAZARDOUS MATERIALS INCIDENTS: 136 serious HAZMAT events have been reported since 1970 through the PHMSA. There are 87 TRI Facilities in the region. Future occurrences are possible.

- NUCLEAR EMERGENCY: There is 1 nuclear facility within 50 miles of the region. No major historical occurrences were found, and future occurrences are unlikely.
- TERRORISM: Although there are a number of potential targets for terrorist in the region, future occurrences are unlikely.
- CYBER: Cyber is an emerging hazard for the region. Future occurrences are possible.
- ELECTROMAGNETIC PULSE: EMP is a low- probability hazard for the region.

In concluding the review of Hazard Profiles, Mr. Slaughter stated if anyone had additional information for the hazard profiles. Planning committee members offered the following comments:

- Continue to include rip currents as a hazard in the plan even though it is not included in the plan.
- Separate sinkholes and coastal erosion into their own hazards and not combine them as geological hazards.

After the open discussion, Mr. Slaughter asked the planning committee members to call or email him with their concerns or additional comments on the risk assessment.

The results of the hazard identification process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Flood, Hurricanes/Coastal Hazards, Cyber, Tornadoes/Thunderstorm. The committee reviewed most recent hazard profile data and discussed separating sinkholes and erosion into separate hazards. The committee also wished to add rip currents as a hazard to be evaluated.

Mr. Slaughter then displayed maps that presented each county's social vulnerability, as documented by the Center for Disease Control. The maps present how socially vulnerable areas in each county are as compared to the rest of North Carolina. Many indicators were used to determine the social vulnerability, and the factors were grouped into four themes that were based on census-tract levels.

After a brief break, Mr. Slaughter then presented the Capability Assessment Findings. ESP Associates used a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule (BCEGS) score, and Community Rating System (CRS) participation.

Mr. Slaughter reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. He indicated that the best-case scenario for communities was to have high capability and low vulnerability. Conversely, the worst-case scenario for communities was to have high vulnerability and low capability. Most jurisdictions are in the moderate to high range for Planning and Regulatory Capability and in the low to moderate range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, mainly with respect to availability of planners and grant writers. Based upon the scoring methodology, it was determined that all of the participating jurisdictions have moderate or high capabilities to implement hazard mitigation programs and activities.

Members of the planning committee mentioned a joint land use study that was recently completed for some of the participating jurisdictions and the Army's Military Ocean Terminal Sunny Point (MOTSU). Mr. Slaughter indicated that he would review the study and incorporate it into the capability assessment as appropriate.

Mr. Slaughter then transitioned to the Mitigation Strategy portion of the presentation. He began by reviewing some of the major concepts of mitigation and then gave the results of the icebreaker exercise from the first Regional Hazard Mitigation Planning Committee meeting, where attendees were given "money" to spend on various hazard mitigation techniques. The results were as follows:

- Prevention $232
- Structural Projects $148
- Property Protection $116
- Emergency Services $80
- Natural Resource Protection $62
- Public Education and Awareness $42

Mr. Slaughter gave an overview of the process for updating the Mitigation Strategy and presented the existing mitigation goals for the regional plan. He asked the Regional Hazard Mitigation Planning Committee to review the goals to determine whether or not they still reflect current vulnerabilities and current mitigation priorities. The committee members agreed that the goals were still relevant and should remain the goals moving forward.

Mr. Slaughter then indicated that each participating jurisdiction would need to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by March 21, 2019. Mr. Slaughter also discussed the Mitigation Action Worksheets to be completed for any new mitigation actions and requested that all worksheets be returned by March 21, 2019. Mr. Slaughter then presented sample mitigation actions for the committee members to consider to include in their plan update.

Mr. Slaughter then discussed the results of the public participation survey that was posted on several of the participating counties' and jurisdictions' websites. As of the meeting date, 790 responses had been received. Based on the preliminary results, respondents felt that hurricanes, and flooding posed the greatest threats to their neighborhood. Most did not live in a floodplain or have flood insurance, but 73.8% of all respondents did not know who to contact regarding reducing their risks to hazards.

Finally, Mr. Slaughter discussed the next steps in the planning process. These included returning mitigation action updates and delivery of a draft plan in May 2019. He thanked the group for taking the time to attend and the meeting was adjourned.

2.6 INVOLVING THE PUBLIC

44 CFR Requirement

44 CFR Part 201.6(b)(1): The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval

An important component of the mitigation planning process involved public participation. Individual citizen and community-based input provides the entire planning team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community's overall mitigation strategy aimed at making a home, neighborhood, school, business or entire city safer from the potential effects of hazards.

Public involvement in the development of the *Southeastern NC Regional Hazard Mitigation Plan* was sought using three methods: (1) physical public meetings; (2) public survey instruments were made available in hard copy and online; and (3) copies of the draft Plan deliverables were made available for public review on county and municipal websites and at government offices. The public was provided three opportunities to be involved in the development of the regional plan at distinct periods during the planning process: (1) during the drafting stage of the Plan; and (2) upon completion of a final draft Plan, but prior to official plan approval and adoption and (3) at the time of official plan adoption by the governing body of each participating jurisdiction. In addition, a public survey (discussed in greater detail in Section 2.6.1) was made available during the planning process at various locations throughout Brunswick, New Hanover, Onslow and Pender and on county and municipal websites. Documentation of these efforts is provided in Appendix D.

In addition to the opportunities for public comments previously discussed, each of the participating jurisdictions will hold public meetings before the final plan is officially adopted by the local governing bodies. These meetings will occur at different times once FEMA has granted conditional approval of the Plan. Adoption resolutions will be included in Appendix A.

Meeting Minutes from Public Meeting #1
October 22, 2019
New Hanover County Northeast Library

Nathan Slaughter, Department Manager from ESP Associates, Inc. and Project Manager for the update of the Southeastern NC Regional Hazard Mitigation Plan, began the meeting by giving a brief overview of the project and the purpose of the meeting.

He explained that the project is funded by a FEMA PDM grant and is conducted to comply with the Disaster Mitigation Act of 2000 and NC Senate Bill 300. He then discussed the region's high, moderate, and low risk hazards that the Regional Hazard Mitigation Planning Team had elected.

Next, Mr. Slaughter defined mitigation and identified the six hazard mitigation planning techniques: prevention, property protection, natural resource protection, structural projects, emergency services,

and public education and awareness. He followed by providing the list of all participating counties and their respective jurisdictions.

Mr. Slaughter then showed an example of the previous Mitigation Action Plan and asked the following questions:

- Where are trouble spots in your neighborhood?
- How can mitigation be improved in your community?
- Which mitigation techniques need improvement?

The meeting concluded after the attendees gave their personal opinions and filled out the public survey.

Meeting Minutes from Public Meeting #2
October 23, 2019
Oak Island City Council Chambers

Mr. Slaughter and Steve Edwards from the Town of Oak Island were present for this meeting; however, because no citizens or stakeholders attended this opportunity for public comment, the meeting was adjourned without a formal presentation given.

Meeting Minutes from Public Meeting #3
November 12, 2019
Onslow County Emergency Operations Center

Nathan Slaughter, Department Manager from ESP Associates, Inc. and Project Manager for the update of the Southeastern NC Regional Hazard Mitigation Plan, began the meeting by giving a brief overview of the project and the purpose of the meeting.

He explained that the project is funded by a FEMA PDM grant and is conducted to comply with the Disaster Mitigation Act of 2000 and NC Senate Bill 300. He then discussed the region's high, moderate, and low risk hazards that the Regional Hazard Mitigation Planning Team had elected.

Next, Mr. Slaughter identified the six hazard mitigation planning techniques: prevention, property protection, natural resource protection, structural projects, emergency services, and public education and awareness. He followed by providing the list of all participating counties and their respective jurisdictions.

Mr. Slaughter then showed an example of the previous Mitigation Action Plan and asked the following questions:

- Where are trouble spots in your neighborhood?
- How can mitigation be improved in your community?
- Which mitigation techniques need improvement?

The meeting concluded after the attendees gave their personal opinions and filled out the public survey.

The final opportunity for public input on the plan came at each participating jurisdictions' County or City Council meeting where the plan was presented for formal adoption. Each of those meetings are open to

the public and therefore provided the public an opportunity to provide any final input or comments on the plan.

2.6.1 Public Participation Survey

The Regional Hazard Mitigation Committee was successful in getting citizens to provide input to the mitigation planning process through the use of the *Public Participation Survey*. The *Public Participation Survey* was designed to capture data and information from residents of the Southeastern NC Region that might not be able to attend public meetings or participate through other means in the mitigation planning process.

Copies of the *Public Participation Survey* were distributed to the Regional Hazard Mitigation Committee to be made available for residents to complete at local public offices. Additionally, a link to an electronic version of the survey was also posted on each county's and municipal websites. A total of 792 survey responses were received, which provided valuable input for the Regional Hazard Mitigation Committee to consider in the development of the plan update. Selected survey results are presented below.

- Approximately 93 percent of survey respondents had been impacted by a disaster, primarily hurricanes.
- Respondents ranked Hurricanes and Coastal Hazards as the highest threat to their neighborhood (69.8 percent), followed by Flooding (14.4 percent), and, Severe Thunderstorms/High Winds (5.2 percent).
- Approximately 65 percent of respondents have taken actions to make their homes more resistant to hazards and 88.4 percent are interested in making their homes more resistant to hazards.
- 73.7 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Emergency Services and Prevention were ranked as the most important activities for communities to pursue in reducing risks.

More detailed results can be found in Appendix D of this plan.

2.7 INVOLVING THE STAKEHOLDERS

44 CFR Requirement

44 CFR Part 201.6(b)(2): The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other non-profit interests to be involved in the planning process.

At the beginning of the planning process for the development of this plan, the project consultant worked with each of the four County Emergency Management leads to initiate outreach to stakeholders to be involved in the planning process. The project consultant distributed a list of recommended stakeholders provided from FEMA Publication 386-1 titled **Getting Started: Building**

Support for Mitigation Planning, which demonstrated the wide range of stakeholders that were considered to participate in the development of this plan. Each of the County Emergency Management leads used that list for reference as they invited stakeholders from their counties to participate in the planning process.

In addition to participation from a wide variety of County-level departments, additional stakeholders that were involved in the process of developing this plan included a variety of non-governmental stakeholders as listed in Section 2.4.

The Regional Hazard Mitigation Committee encouraged more open and widespread participation in the mitigation planning process. The region also went above and beyond in its local outreach efforts through the design and distribution of the *Public Participation Survey*. This opportunity was provided for local officials, residents, businesses, academia, and other private interests in the Southeastern NC Region to be involved and offer input throughout the local mitigation planning process.

2.8 DOCUMENTATION OF PLAN PROGRESS

Progress in hazard mitigation planning for the participating jurisdictions in the Southeastern NC Region is documented in this plan update. Since hazard mitigation planning efforts officially began in the participating counties with the development of the initial Hazard Mitigation Plans in the late 1990s and early 2000s, many mitigation actions have been completed and implemented in the participating jurisdictions. These actions will help reduce the overall risk to natural hazards for the people and property in the Southeastern NC Region. The actions that have been completed are documented in Appendix E.

Further documentation of plan implementation progress can be found in the Capability Assessment. Community capability continues to improve for each participating jurisdiction with the implementation of new plans, policies and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 7: *Capability Assessment*. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by reconvening the Regional Hazard Mitigation Committee to update the Plan and by continuing to involve the public in the hazard mitigation planning process.

2.9 CRS COMMUNITY PLANNING PROCESS DOCUMENTATION

There are fourteen communities in the Southeastern NC Region that participate in the CRS. They are:

- Caswell Beach
- Holden Beach
- Oak Island
- Ocean Isle Beach
- Southport
- Sunset Beach
- New Hanover County
- Carolina Beach
- Kure Beach
- Wrightsville Beach
- Topsail Beach
- Onslow County
- Jacksonville
- North Topsail Beach

As a participant in the NFIP's CRS program, each of these communities took additional steps during the 2020 update of this plan to meet the CRS requirements of Activity 510: Floodplain Management

Planning and attempt to maximize the number of points the communities received for this activity for this plan. Specific to the planning process, the communities ensured the following activities took place:

- Assigned County and City staff to serve on the Regional Hazard Mitigation Planning Committee. The staff members assigned to the committee actively participated in the plan update process and represent a wide range of staff expertise in the areas of mitigation techniques. The staff and their associated area of expertise are listed in Table 2.5.

TABLE 2.5: CRS COUNTY AND CITY STAFF MEMBERS OF THE SOUTHEASTERN NC REGIONAL HAZARD MITIGATION PLANNING TEAM AND THEIR AREA OF EXPERTISE

NAME	DEPARTMENT / AGENCY / TITLE	MITIGATION TECHNIQUE					
		PREVENTION MEASURES	PROPERTY PROTECTION	NATURAL RESOURCE PROTECTION	EMERGENCY SERVICES	STRUCTURAL PROJECTS	PUBLIC INFORMATION
Hicks, Chad	Town, Administrator, Caswell Beach	X	X	X	X	X	X
	Caswell Beach	X	X	X	X	X	X
Murphy, Miles	Planner, Carolina Beach	X	X	X	X	X	X
Abbotts, Gloria	Graduate Fellow, Carolina Beach	X	X	X	X	X	X
Evans, Timothy Dale	Planning and Inspections Director, Holden Beach	X	X	X	X	X	X
Wooten, Rhonda	CAMA/Zoning Official, Holden Beach	X	X	X	X	X	X
	Kure Beach	X	X	X	X	X	X
	Kure Beach	X	X	X	X	X	X
Edwards, Steve	Development Services Director, Oak Island	X	X	X	X	X	X
Kelly, David	Town Manager, Oak Island	X	X	X	X	X	X
Welsh, Trevor	Building Inspector, Wrightsville Beach	X	X	X	X	X	X
	Wrightsville Beach	X	X	X	X	X	X
Dycus, Keith	Development Services Specialist, Ocean Isle Beach	X	X	X	X	X	X
Whiteside, Justin	Assistant Town Manager, Ocean Isle Beach	X	X	X	X	X	X
	Topsail Beach	X	X	X	X	X	X

NAME	DEPARTMENT / AGENCY / TITLE	MITIGATION TECHNIQUE					
		PREVENTION MEASURES	PROPERTY PROTECTION	NATURAL RESOURCE PROTECTION	EMERGENCY SERVICES	STRUCTURAL PROJECTS	PUBLIC INFORMATION
	Topsail Beach	X	X	X	X	X	X
Lloyd, Thomas	City Planner, Southport	X	X	X	X	X	X
	Southport	X	X	X	X	X	X
Miles, Stacie	Emergency Management Deputy Director, Onslow County	X	X	X	X	X	X
Rhue, Jessica	Planning Director, Onslow County	X	X	X	X	X	X
Rademacher, Todd	Planning Director, Sunset Beach	X	X	X	X	X	X
	Sunset Beach	X	X	X	X	X	X
Tallman, Tee	Fire Chief, Jacksonville	X	X	X	X	X	X
Massey, Ron	Deputy City Manager, Jacksonville	X	X	X	X	X	X
McRay, Anna	Emergency Management Deputy Director, New Hanover County	X	X	X	X	X	X
Vafier, Ken	Planning Manager, New Hanover County	X	X	X	X	X	X
Hill, Deb	Planning Director, North Topsail Beach	X	X	X	X	X	X
	North Topsail Beach	X	X	X	X	X	X

- A CRS Steering Committee was established and was comprised of 50% public sector and 50% private sector/citizen representation. This was done to meet the requirements of CRS Planning Step 2. The makeup of the steering committee is discussed in Section 2.4.
- Ensured that the first public meeting held during the plan update process was conducted within the first two months of the planning process. As previously documented, the first meeting in the plan update process (Regional Hazard Mitigation Planning Committee Kickoff Meeting) was held on September 18, 2019. The first public meeting was held in the evening of October 22, 2019, just over a month from the beginning of the plan update process.
- Invited multiple outside stakeholders to participate in the plan update process. An email was sent to the following stakeholders to invited them to attend the public meeting. The email invitation is included in Appendix D.

    - Onslow County Schools

- **Cape Fear Community College**
- **WH**
- **NHRMC**
- **NHREMS**
- **NHREMS**
- **NHRMC EM**
- **New Hanover Disaster Coalition**
- **USCG**
- **USCG**
- **USCG**
- **CFPUA**
- **CFPUA**
- **Southeastern Healthcare Preparedness Region**
- **Harrelson Center/HelpHub/NHDC**
- **GE-Hitachi Nuclear**
- **United Way CFA**
- **Onslow County Albert J Ellis Airport**
- **Coastal Carolina Community College**
- **Water Resources Private Consultant**
- **New Hanover Disaster Coalition**
- **State of NC – Fort Fisher**
- **UNCW**
- **American Red Cross**

Bold font indicates the organizations that attended the meeting and/or filled out public surveys.

- Ensured that the final public meeting at least two weeks before submittal of the final plan to County and City governing bodies for adoption.

SECTION 3
COMMUNITY PROFILE

This section of the Plan provides a general overview of the Southeastern NC Region. It consists of the following four subsections:

- 3.1 Geography and the Environment
- 3.2 Population and Demographics
- 3.3 Housing, Infrastructure, and Land Use
- 3.4 Employment and Industry

3.1 GEOGRAPHY AND THE ENVIRONMENT

The Southeastern NC Region is located in the Southeastern Coastal Plain of North Carolina. **Figure 3.1** below provides a map of the region. Elevations throughout the four counties range from approximately sea level to roughly 75 feet above sea level within the northern and western portions of the region. The land surfaces throughout the region are nearly level to gently sloping. Drainage throughout the majority of the region flows to the Cape Fear River. Western Brunswick County drains to the Waccamaw River while the western portions of Pender County drain to the Black River. The Black River is one of only two rivers in the Nation considered pollution-free. The primary river in Onslow County is the New River which begins and ends in the County.

The total land area of each of the participating counties is presented in **Table 3.1**.

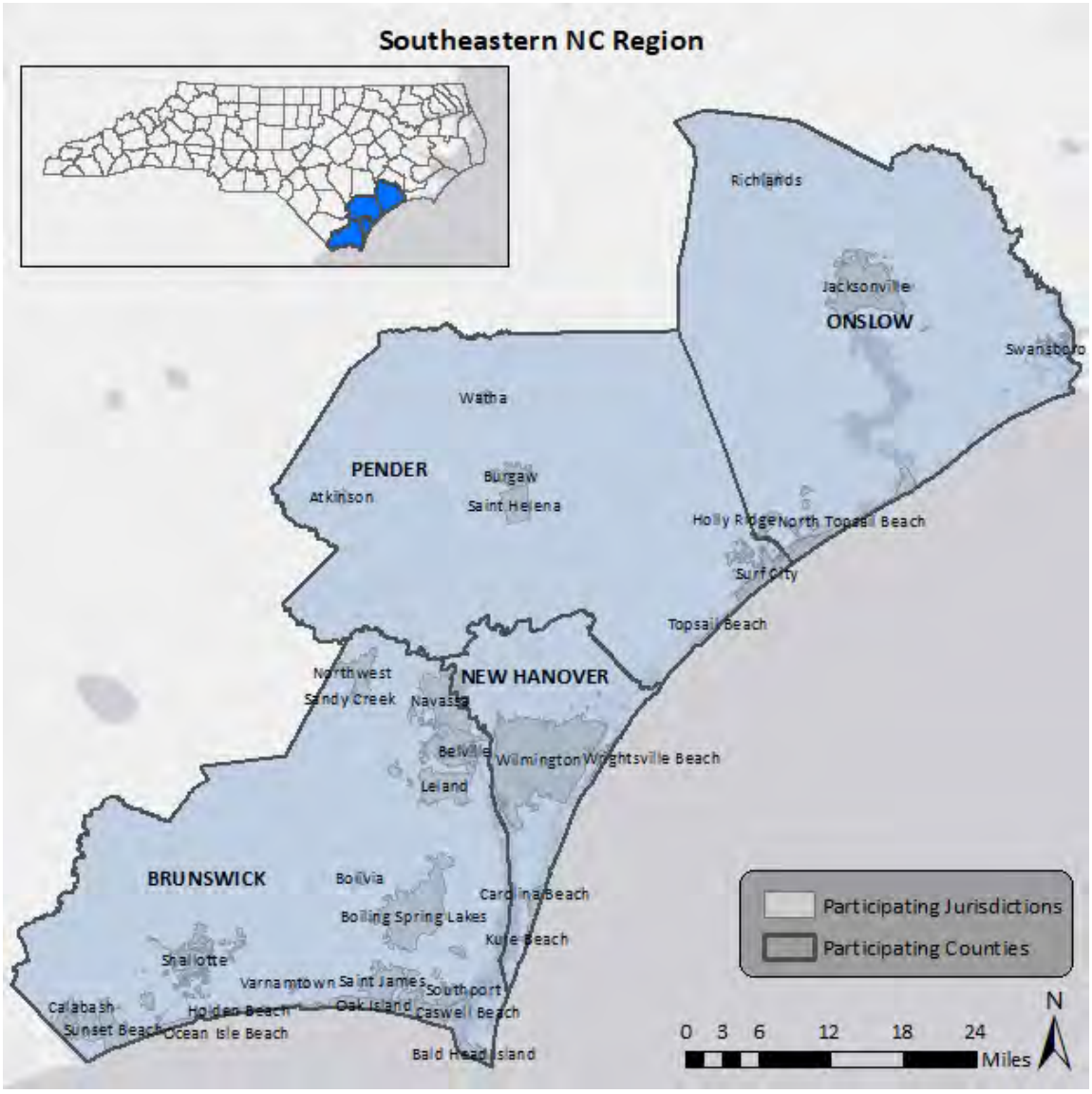
TABLE 3.1: TOTAL LAND AREAS OF PARTICIPATING COUNTIES

County	Total Land Area (Square Miles)
Brunswick County	893.7
New Hanover County	220.3
Onslow County	815.9
Pender County	882.0

Source: US Census Bureau

The Southeastern NC Region gets an average of 55 inches of precipitation per year. Snowfall average is less than 2 inches for the region. On average, there are 215 sunny days per year in the Region. The July high temperature is around 90 degrees Fahrenheit. The January low temperature is 33 degrees Fahrenheit.

FIGURE 3.1: SOUTHEASTERN NC REGION ORIENTATION MAP



3.2 POPULATION AND DEMOGRAPHICS

Population estimates as of 2019 put the population of the Southeastern NC Region at 638,291. The region has been experiencing rapid growth over the past decade. The regional population density is delineated on **Figure 3.2** and a table with population counts is found in **Table 3.2.**

FIGURE 3.2: POPULATION DENSITY

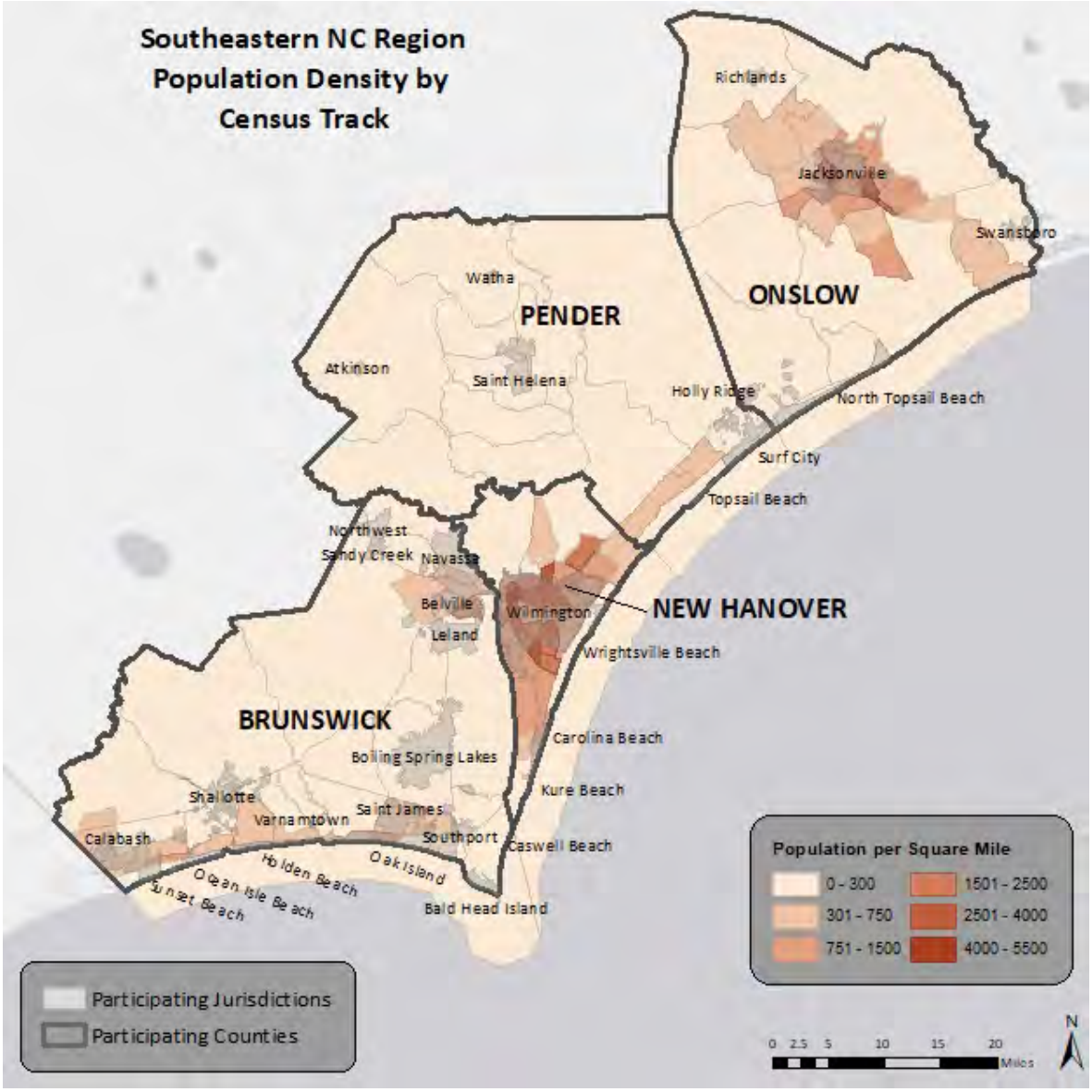


TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING COUNTIES

Jurisdiction	2010 Census Population	2013 Population Estimate	2016 Population Estimate	2019 Population Estimate	% Change 2010-2019
Brunswick County	107,431	114,992	126,304	142,820	33%
New Hanover County	202,667	212,921	224,809	234,473	16%
Onslow County	177,772	192,354	192,314	197,938	11%
Pender County	52,217	54,779	58,771	63,060	21%

Source: US Census Bureau, NC Office of State Budget and Management

Based on the 2010 Census and 2018 estimates, the median age of residents of the participating counties ranges from 39.1 to 42.9 years. The racial characteristics of the participating counties are presented in

Table 3.3. Generally, whites make up the majority of the population in the region accounting for over 75 percent of the population.

TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING COUNTIES

Jurisdiction	White, percent (2018)	Black or African American, percent (2018)	American Indian or Alaska Native, percent (2018)	Asian, percent (2018)	Native Hawaiian or Other Pacific Islander, Percent (2018)	Some other race, percent (2018)	Two or more races, percent (2018)
Brunswick County	83.7%	10.3%	0.6%	0.6%	0.6%	2.6%	2.2%
New Hanover County	81.0%	14.0%	0.2%	1.3%	0.1%	1.1%	2.1%
Onslow County	74.5%	14.2%	0.5%	2.1%	0.2%	2.0%	6.4%
Pender County	76.9%	14.9%	0.3%	0.5%	0.1%	4.7%	2.7%

*Hispanics may be of any race, so also are included in applicable race categories
Source: US Census Bureau

3.3 HOUSING, INFRASTRUCTURE AND LAND USE

3.3.1 Housing

According to the US Census Bureau, in 2017 there were an estimated 305,221 housing units in the Southeastern NC Region, the majority of which are single family homes or mobile homes. Housing information for the four participating counties is presented in **Table 3.4**. As shown in the table, New Hanover County has a higher number of housing units compared to the other counties. Pender County has the least.

TABLE 3.4: HOUSING DATA FOR PARTICIPATING JURISDICTIONS

Location	Total Housing Units (2017)	Units Built 2010 or later	% Building Stock built Post-2010
Brunswick County	**92,284**	**12,779**	**13.8%**
Bald Head Island	1,200	38	3.2%
Belville	909	15	1.7%
Boiling Spring Lakes	1,434	89	6.2%
Bolivia	83	-	0.0%
Calabash	1,535	52	3.4%
Carolina Shores	2,532	111	4.4%
Holden Beach	2,525	36	1.4%
Leland	8,041	1,322	16.4%
Navassa	747	24	3.2%
Northwest	394	9	2.3%
Oak Island	9,001	228	2.5%
Ocean Isle Beach	3,409	402	11.7%
Sandy Creek	109	8	7.3%
Shallotte	2,076	79	3.8%
Southport	1,907	162	8.5%
St. James	2,978	656	22.0%
Sunset Beach	5,157	242	4.7%
Varnamtown	296	-	0.0%

Location	Total Housing Units (2017)	Units Built 2010 or later	% Building Stock built Post-2010
Unincorporated Area	47,951	9,306	19.4%
New Hanover County	**107,369**	**4,319**	**4.0%**
Carolina Beach	5,744	143	2.5%
Kure Beach	2,185	80	3.7%
Wilmington	57,147	2,013	3.5%
Wrightsville	2,826	-	0.0%
Unincorporated Area	39,467	2,083	5.3%
Onslow County	**77,453**	**11,151**	**14.4%**
Holly Ridge	1,196	438	36.6%
Jacksonville	23,717	3,409	14.4%
North Topsail Beach	2,571	60	2.3%
Richlands	853	258	30.2%
Swansboro	1,562	200	12.8%
Unincorporated Area	47,554	6,786	14.3%
Pender County	**28,115**	**1,547**	**5.5%**
Atkinson	143	-	0.0%
Burgaw	1,348	-	0.0%
St. Helena	194	2	1.0%
Surf City	3,780	302	8.0%
Topsail Beach	1,295	34	2.6%
Watha	104	2	1.9%
Unincorporated Area	21,251	1,207	5.7%
Southeastern NC Regional Total	**305,221**	**29,796**	**9.7%**

Source: US Census Bureau

3.3.2 Infrastructure

Transportation

Key transportation routes through the Region include US 421 running north-south through Pender/New Hanover Counties, Interstate 40 running north-south from Wilmington to Raleigh, and US 76 extending from western North Carolina to Wilmington. The primary north-south route through the counties is US Highway 17. CSX Transportation provides service running north-south from Raleigh and east-west from Charlotte to the Wilmington terminus. The CSX western route connects to the federal rail line serving the Sunny Point Ocean Terminal in Brunswick County. The Wilmington International Airport (ILM) or the Raleigh-Durham International Airport (RDU) are the primary providers of air transportation service.

Utilities

Electrical power in the Southeastern NC Region is provided by Duke Energy Progress and several electricity cooperatives. The electricity cooperatives servicing the region include Brunswick Electric, Jones-Onslow Electric Membership Cooperation (JOEMC), and Four County Electric Membership.

Water and sewer services are provided by many of the towns in the Southeastern NC Region as well as by Onslow Water and Sewer Authority (ONWASA), Pender County Utilities (PCU), which are county-wide water providers, and Cape Fear Utility Authority which provides service in New Hanover County. Although parts of the region require the use of wells and septic systems, much of the region is covered under either municipal or county providers.

Community Facilities

There are a number of public buildings and community facilities located throughout the Southeastern NC Region. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 217 fire/EMS stations, 47 police stations, and 123 public schools located within the study area.

There are 305 medical care facilities located in the Southeastern NC Region, including hospitals, nursing homes, hospice care, and rehabilitation facilities. The largest is New Hanover Regional Medical Center, a 769-bed hospital located in Wilmington. Other hospitals in the region include Cape Fear Hospital, Onslow Memorial Hospital, Navy Medical Center Camp Lejeune, J. Arthur Dosher Memorial Hospital, Pender Memorial Hospital, and Brunswick Community Hospital.

In addition to its beaches, the Southeastern NC Region contains numerous local parks and recreation areas, including Brunswick Nature Park, Airlie Gardens, New River Waterfront Park, Hammocks Beach State Park, and Millers Pond Park. These facilities offer recreational opportunities to area residents and many visitors each year.

3.3.3 Land Use

Land use in the Southeastern NC region varies across each county. A large portion of the development in the Region is found in the area surrounding Wilmington and Jacksonville, and along the coastline, where development takes advantage of the region's numerous beaches.

As shown in **Figure 3.1** above, there are many unincorporated areas located throughout the study area which cover a great deal of the region's land area. Most of the region's population comes from incorporated communities. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area generally consist of residential and commercial development in the municipal areas with agricultural uses in the more rural areas.

While population growth and development in the region remains relatively steady, growth that is occurring is well-managed by the participating jurisdictions. The Capability Assessment found in Section 7 provides an overview of the land use tools that are in place in each jurisdiction. Local land use (and associated regulations) is further discussed in the Capability Assessment as well.

3.4 EMPLOYMENT AND INDUSTRY

The early modern economy in the Southeastern NC Region was built around agricultural industries such as wheat, sweet potatoes, dairy, cotton, and textiles. Like many other towns in North Carolina, the jurisdictions in the Southeastern NC Region have focused recent economic development efforts on cultural and recreational tourism.

According to the North Carolina Department of Commerce, Labor and Economic Analysis Division, in 2018, Brunswick County had a labor force of 50,144 workers. As of 2015, the top five employers in Brunswick County were the Brunswick County Board of Education, Progress Energy, County of Brunswick, Wal-Mart Associates, and Food Lion. In 2019, the unemployment rate was 4.6 compared to the State rate of 3.9.

New Hanover County had a labor force of 116,493 workers as of 2018. As of 2015, the top five employers in New Hanover County were the New Hanover Regional Medical Center, New Hanover County School

System, UNC-Wilmington, PPD Development, and the County of New Hanover and the unemployment rate was 3.0 compared to the State rate of 3.9.

Onslow County had an average annual employment of 61,301 workers as of 2018. As of 2015, the top five employers in Onslow County were the Department of Defense, Onslow County Board of Education, Marine Corps Community Services, Wal-Mart Associates, and the County of Onslow. The unemployment rate was 4.0 compared to the State rate of 3.9.

Pender County had an average annual employment of 27,107 workers as of 2018. As of 2015, the top five employers in Pender County were Pender County Board of Education, Pender County, NC Department of Public Safety, Pender Memorial Hospital, and LL Building Products and the unemployment rate was 3.4 compared to the State rate of 3.9.

SECTION 4
HAZARD IDENTIFICATION

This section describes how the planning team identified the hazards to be included in this plan. It consists of the following five subsections:

- 4.1 Overview
- 4.2 Disaster Declarations
- 4.3 Summary of Hazard Impacts Since Previous Plan
- 4.4 Hazard Evaluation
- 4.5 Hazard Identification Results

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

4.1 OVERVIEW

The Southeastern NC Region is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. Current FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (i.e., technological hazards, terrorism, etc.) is encouraged, though not required, for plan approval. However, the Southeastern NC Region has decided to conduct a comprehensive assessment of both types of hazards to align with the hazards found in the North Carolina State Hazard Mitigation Plan and to reflect a more all-hazards approach to planning.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the participating jurisdictions in the Southeastern NC Region have identified a number of hazards that are to be addressed in its Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Southeastern NC Regional Hazard Mitigation Planning Committee members, research of past disaster declarations in the participating counties[1], and review of the North Carolina State Hazard Mitigation Plan (2018). Therefore, since the development of the previous version of this plan, the hazards identified and included in the plan have changed. A list of all previous hazards covered in the 2016 Southeastern NC Regional Hazard Mitigation Plan is viewable in **Table 4.1**, along with a summary of the hazards assessed in this 2020 update. Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

[1] A complete list of disaster declarations for the Southeastern NC Region can be found below in Section 4.3.

TABLE 4.1: 2020 SOUTHEASTERN NC HAZARDS UPDATE

Identified Hazards for the 2016 Southeastern NC Regional Hazard Mitigation Plan	Identified Hazards for the 2021 Southeastern NC Regional Hazard Mitigation Plan		Sub hazards covered in 2021 Plan and Explanations
Droughts/Heat Waves	Natural Hazards	Separate hazards of Drought and Excessive Heat	Agricultural Drought, Hydrological Drought
Hurricanes and Coastal Storms		Hurricane and Coastal Hazards	Nor'easters, Storm Surge, Rip Currents
Tornados		Tornadoes/Thunderstorms	Hailstorm, Torrential Rain associated with Severe Thunderstorms, Thunderstorm Wind, Lightning, Waterspout, High Wind
Severe Thunderstorms/Windstorms, Lightning and Hail			Assessed under "Tornadoes/Thunderstorms"
Winter Storms and Freezes		Severe Winter Weather	Freezing Rain, Snowstorms, Blizzards, Wind Chill, Extreme Cold
Dam/Levee Failure		Dam Failures	
Erosion			Assessed under "Geological"
Flooding		Flooding	
Rip Currents		Rip Currents	Assessed under "Hurricanes and Costal Hazards"
Earthquakes		Earthquakes	
Coastal Erosion		Geological Hazards	Sinkholes, Coastal Erosion
Sinkholes		Geological Hazards	Sinkholes, Coastal Erosion
Wildfires	Other Hazards	Wildfires	
		Infectious Disease	
Tsunamis		Tsunami	
	Technological Hazards	Hazardous Substances	Hazardous Materials, Hazardous Chemicals, Oil Spill
		Radiological Emergency – Fixed Nuclear Facilities	
		Terrorism	Chemical, Biological, Radiological, Nuclear, Explosive
		Cyber	
		Electromagnetic Pulse	

Note: The hazards identified in the previous version of the Onslow County plan varied only slightly from the hazards in the previous Southeastern NC regional plan, primarily in terms of minor changes in terminology used. The only major difference was that the Onslow County plan identified Storm Surge as a separate hazard. For this plan update, storm surge is included as a sub hazard of Hurricanes and Coastal Hazards.

4.2 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the Southeastern NC regional planning area. Since 1984, nineteen presidential disaster declarations have been reported in the Southeastern NC Region, which can be seen in **Table 4.2** below. Of these disaster declarations, fifteen of the nineteen were related to hurricanes and tropical storms, and three related to severe storms that included flooding and tornadoes. One of the most recent declarations was a result of the global pandemic caused by COVID-19.

TABLE 4.2: DISASTER DECLARATION IN THE SOUTHEASTERN NORTH CAROLINA REGION

Year	Disaster Number	Description	Brunswick County	Onslow County	Pender County	New Hanover County
1984	724	HURRICANE DIANA	X		X	X
1989	844	HURRICANE HUGO	X			
1996	1127	HURRICANE BERTHA	X	X	X	X
1996	1134	HURRICANE FRAN	X	X	X	X
1998	1240	HURRICANE BONNIE	X	X	X	X
1999	1292	HURRICANE FLOYD	X	X	X	X
2003	1490	HURRICANE ISABEL	X	X	X	X
2005	1608	HURRICANE OPHELIA	X	X	X	X
2008	1801	TROPICAL STORM HANNA	X			X
2010	1942	SEVERE STORMS, FLOODING, AND STRAIGHT-LINE WINDS	X	X	X	X
2011	1969	SEVERE STORMS, FLOODING, TORNADOES		X		
2011	4019	HURRICANE IRENE	X	X	X	X
2016	4285	HURRICANE MATTHEW	X	X	X	X
2018	4393	HURRICANE FLORENCE	X	X	X	X
2019	4412	TROPICAL STORM MICHAEL	X			
2019	4465	HURRICANE DORIAN	X	X	X	X
2020	4487	COVID-19 PANDEMIC	X	X	X	X
2020	4543	SEVERE STORMS, TORNADOES, AND FLOODING			X	

4.3 SUMMARY OF HAZARD IMPACTS SINCE PREVIOUS PLAN

Since the approval date of the previous Southeastern NC Regional Hazard Mitigation Plan (November 16, 2016) and the Onslow County Hazard Mitigation Plan (July 2014), there have been 243 hazard events recorded for the region in the National Center for Environmental Information Storm Events Database. It is important to take note of those hazard events and consider them in the *Hazard Identification* section to help them ensure that the appropriate hazards are being considered in the risk assessment sections and in the Mitigation Strategy. **Table 4.3** documents the hazard events recorded. Details for some of these events are discussed in further detail in the *Hazard Profiles* section and *Appendix H*.

TABLE 4.3: SUMMARY OF HAZARD EVENTS SINCE PREVIOUS PLAN

Hazard Type*	Number of Reported Events in Brunswick County	Number of Reported Events in New Hanover County	Number of Reported Events in Onslow County	Number of Reported Events in Pender County
Flash Flood	16	29	6	25
Flood	22	25	1	9
Hail	13	5	10	6
High Wind	0	2	0	0
Lightning	0	3	1	2
Thunderstorm Wind	11	12	15	14
Tornado	3	0	0	0
Tropical Storm	1	1	3	0
Winter Storm	1	2	1	2
Winter Weather	0	0	1	1
TOTAL NUMBER OF REPORTED EVENTS	**67**	**79**	**38**	**59**

*The hazard type names that NCEI uses are different than the names of hazards used in this plan; however, one can still get an understanding of the types of hazards that impact the region as the hazard types are similar in name.

4.4 HAZARD EVALUATION

Table 4.4 documents the evaluation process used for determining which of the initially identified hazards are considered significant enough to warrant further evaluation in the risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the Regional Hazard Mitigation Planning Committee during the plan update process.

TABLE 4.3: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
NATURAL HAZARDS			
Avalanche	**NO**	• Review of US Forest Service National Avalanche Center web site • Review of the NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• There is no risk of avalanche events in North Carolina. The United States avalanche hazard is limited to mountainous western states including Alaska, as well as some areas of low risk in New England. • Avalanche was not included in the previous Southeastern NC Regional Hazard Mitigation Plan or the Onslow County Hazard Mitigation Plan. • Avalanche is not included in the previous Southeastern NC Regional Hazard Mitigation Plan or the Onslow County Hazard Mitigation Plan.
Drought	**YES**	• Review of the NC State Hazard Mitigation Plan • Review of the North Carolina Drought Monitor website • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• There are reports of drought conditions in all of the last nineteen years in the Southeastern NC Region, according to the North Carolina Drought Monitor. • Droughts are discussed in NC State Hazard Mitigation Plan. • Drought is included in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.
Hailstorm	**YES (Assessed under Tornadoes/ Thunderstorms)**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NOAA NCEI Storm Events Database • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Hailstorm events are discussed in the state plan under the Severe Thunderstorm hazard. • NCEI reports 536 hailstorm events (3/4-inch size hail to 2.75 inches) for the Southeastern NC Region between 1966 and November 2019. For these events there are over $74 thousand in property damages but no deaths or injuries. • Although hail is not addressed as an individual hazard in the previous regional hazard mitigation plan or the Onslow County plan, it is

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			addressed as a sub-item under various hazards.
Excessive Heat	**YES**	• Review of NOAA NCEI Storm Events Database • Review of the North Carolina State Hazard Mitigation Plan • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• NCEI reported 23 extreme heat events for the Southeastern NC counties. • The NC State Hazard Mitigation Plan includes Excessive Heat as an identified hazard for North Carolina. • Heat Wave was included as a hazard (combined with Drought) in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.
Hurricane and Coastal Hazards	**YES**	• Review of NC State Hazard Mitigation Plan • Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website • Review of NOAA NCEI Storm Events Database • Review of historical presidential disaster declarations Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• NOAA historical records indicate 55 hurricanes, 38 tropical storms, and 34 tropical depressions have come within 75 miles of the Southeastern NC Region between 1851 and 2018. • Hurricane and tropical storm events are discussed in the state plan. • Seventeen out of twenty disaster declarations in the Southeastern NC Region are directly related to hurricane and tropical storm events. • Hurricane and Tropical Storm hazard was addressed in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.
Lightning	**YES (Assessed under Tornadoes/ Thunderstorms)**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NOAA NCEI Storm Events Database, NOAA lightning statistics	• Lightning events are discussed in the state plan as part of the Severe Thunderstorm hazard, • NCEI reports 79 (seventy-nine) lightning events for the Southeastern NC region between July 1996 and November 2019. These events have resulted in a recorded 5 (five) deaths, 16

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	(sixteen) injuries, and $4,812,500 in property damage. • Although lightning is not addressed as an individual hazard in any of the previous Southeastern NC county-level hazard mitigation plans, it is addressed under a larger hazard category such as severe thunderstorms. Given the damage and reported death and injuries, individual analysis is warranted.
Nor'easter	**YES (Assessed under Hurricanes/ Coastal Hazards)**	• Review of NC State Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Nor'easters are discussed in the state plan as a part of the Hurricane hazard. The coastal region, which includes the Southeastern NC counties, has the highest vulnerability in the state. • NCEI does not report any Nor'easter activity for the Southeastern NC Region. However, Nor'easters that have affected the region may have been recorded by NCEI as severe winter storms. • This hazard was not addressed as a separate hazard in any of the previous plans.
Tornadoes	**YES (Assessed under Tornadoes/ Thunderstorms)**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NOAA NCEI Storm Events Database • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Tornado events are discussed in the NC State Hazard Mitigation Plan under Severe Thunderstorms. • NCEI reports one hundred and thirty-one (131) tornado events in Southeastern NC Counties between 1951 and December 2018. These events have resulted ninety-seven (97) injuries and have caused six (6) deaths and $25,000,000 in property damage with the most severe being an F3. • Tornado events were addressed in the previous Southeastern NC regional plan and the Onslow County Hazard Mitigation Plan.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Severe Thunderstorm	**YES (Assessed under Tornadoes/ Thunderstorms)**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NOAA NCEI Storm Events Database • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Severe Thunderstorm events are discussed in the NC State Hazard Mitigation Plan. Historical data shows severe thunderstorms are more common in the eastern part of the state, which includes the Southeastern NC region. • NCEI reports 581 thunderstorm events in the Southeastern NC region between 1985 and November 2019. These events have resulted in $5.7 million in property damage. • Severe Thunderstorm events were addressed in the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.
Severe Winter Weather	**YES**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of historical presidential disaster declarations. • Review of NOAA NCEI Storm Events Database • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Severe Winter Weather including snow storms and ice storms is discussed in the state plan. • NCEI reports that the counties in the Southeastern NC region have been affected by 31 snow and ice events between 1993 and January 2018. These events resulted in $145 thousand in property damages. • One of the twenty presidential disaster declarations for the region was related to severe winter weather.
Earthquakes	**YES**	• Review of NC State Hazard Mitigation Plan • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan. USGS Earthquake Hazards Program web site • Review of the National Geophysical Data Center	• Earthquake events are discussed in the state plan and all of the participating counties in the Southeastern NC are considered to be at moderate risk to an earthquake event (no counties are high risk). • Both the previous Southeastern NC regional plan and the Onslow County Hazard Mitigation Plan address earthquakes.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		• Review of FEMA's Multi-Hazard Identification and Risk Assessment	• Earthquakes have occurred in and around the State of North Carolina in the past. The state is affected by the Charleston and the New Madrid (near Missouri) Fault lines which have generated a magnitude 8.0 earthquake in the last 200 years. • According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for the Southeastern NC Region ranges from 1 to 4%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more.
Expansive Soils	**NO**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of USDA Soil Conservation Service's Soil Survey • Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Expansive soils are not included as a hazard in the state plan. • According to FEMA and USDA sources, the Southeastern NC Region is located in an area that has a "little to no" clay swelling potential. • Neither the previous Southeastern NC regional hazard mitigation plan nor the Onslow County Hazard Mitigation Plan identify expansive soils as a potential hazard.
Coastal Hazards (Rip Currents, Storm Surge, Erosion)	**YES (Assessed under Hurricanes/ Coastal Hazards)**	• Review of NC State Hazard Mitigation Plan • Review of USGS Landslide Incidence and Susceptibility Hazard Map • Review of the North Carolina Geological Survey database of historic landslides Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Coastal erosion events are identified as a hazard in the state plan under Geologic Hazards. Storm surge is addressed under Hurricanes/Coastal Hazards. Rip currents are not addressed. • Both the previous Southeastern NC regional hazard mitigation plan and the Onslow County Hazard Mitigation Plan address coastal erosion and rip currents. The Onslow County plan also addresses Storm Surge.
Sinkholes	**YES (Assessed under**	• Review of NC State Hazard Mitigation Plan	• The state plan delineates certain areas that are susceptible to land

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
	Geological Hazards)	• Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	subsidence hazards in North Carolina and most of these areas are located in Southeastern NC counties. • Both the previous regional plan and the Onslow County Hazard Mitigation Plan address sinkholes as a hazard.
Tsunami	**YES**	• Review of NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of FEMA "How-to" mitigation planning guidance (Publication 386-2, "Understanding Your Risks – Identifying Hazards and Estimating Losses).	• Tsunamis are not discussed in the 2018 version of the state plan. The risk for the Atlantic coast for tsunamis is very low to low. • Both the previous regional plan and the Onslow County Hazard Mitigation Plan address tsunami as a hazard. • No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States. • Tsunami inundation zone maps are not available for communities located along the U.S. East Coast. • FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.
Volcano	**NO**	• Review of NC State Hazard Mitigation Plan • Review of USGS Volcano Hazards Program web site • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	• There are no active volcanoes in North Carolina. • There has not been a volcanic eruption in North Carolina in over 1 million years. • No volcanoes are located near the Southeastern NC Region.
Dam Failure	**YES**	• Review of NC State Hazard Mitigation Plan • Review of North Carolina Dam Safety Office's web site	• Dam failure is discussed in the state plan as a hazard of concern for the Southeastern NC Region. • Of the 29 dams reported in the region in the National Inventory of Dams, 9 are high hazard (31.02%),

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		• Review of U.S. Army Corps of Engineers National Inventory of Dams database • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	(High hazard is defined as "where failure or mis operation will probably cause loss of human life.") • Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan address dam failure.
Coastal Erosion	**YES (Referenced in Geological Hazards)**	• Review of NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.	• Erosion is referenced in both the Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan. • Coastal erosion is a major concern for the region
Flooding	**YES**	• Review of NC State Hazard Mitigation Plan • Review of historical disaster declarations • Review of NOAA NCEI Storm Events Database • Review of FEMA's NFIP Community Status Book and Community Rating System (CRS) • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	• The flood hazard is thoroughly discussed in the state plan. • Eighteen of twenty Presidential Disaster Declarations were flood-related and/or caused by hurricane or tropical storm related events. • NCEI reports that Southeastern NC Region counties have been affected by 350 flood events since 1997. • These events in total caused no reported deaths or injuries, but did cause an estimated $28.6 million (2018 dollars) in property damages. • All of the counties and nearly all of the municipalities participate in the NFIP. • Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan address flood hazard.
Storm Surge	**YES (Assessed under Hurricanes/ Coastal Hazards)**	• Review of NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	• Storm surge is discussed in the state plan under the hurricane hazard and indicates that storm surge in eastern NC remains one of the major destructive forces of land-falling tropical storms and hurricanes

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		• Review of NOAA NCEI Storm Events Database	• The previous Southeastern NC Regional Hazard Mitigation Plan. The Onslow County Hazard Mitigation Plan included storm surge as a hazard. • Six historical events were reported by NCEI for the Southeastern NC Region
OTHER HAZARDS			
Wildfires	**YES**	• Review of NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan • Review of Southern Wildfire Risk Assessment (SWRA) Data • Review of the NC Division of Forest Resources website	• Wildfires are identified as a hazard in the state plan. • Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan addressed wildfire. • A review of SWRA data indicates that there are areas of elevated concern in the Southeastern NC Region. • According to the North Carolina Division of Forest Resources, the Southeastern NC Region experiences an average of 94 fires each year which burn a combined average of 3,988 acres each year. • Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases.
Hazardous Substances	**YES**	• Review of the NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	• Hazardous Substances are identified as a hazard in the state plan. • Neither the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan include hazardous materials as a hazard. The previous plans focused only on natural hazards. • This update assesses hazardous materials, hazardous chemicals, and oil spills under this hazard to better align with the State Plan.
Infectious Disease	**YES**	• Review of the NC State Hazard Mitigation Plan	• Infectious Disease is identified as a hazard in the State plan.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		• Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan	• Although neither of the previous hazard mitigation plans for the region included infectious diseases as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan. • Infectious Disease has caused one of the twenty disaster declarations in the Southeastern NC Region.
TECHNOLOGICAL HAZARDS			
Terrorism	**YES**	• Review of the NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan • Review of local official knowledge	• Although none of the previous hazard mitigation plans for the region included terrorism threat as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan. • This hazard will assess chemical, biological, radiological, nuclear, and explosive terrorism events.
Radiological Emergency – Fixed Nuclear Facilities	**YES**	• Review of the NC State Hazard Mitigation Plan • Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan • Review of IAEA list of fixed nuclear power stations in the United States • Discussion with local officials about location of nuclear power stations	• The Brunswick Nuclear Plant is located just north of Southport, North Carolina on the Cape Fear River in Brunswick County. • Nuclear events can sometimes be caused by natural hazards and deserve some attention in this plan due to some areas of the region being located in the 10 mile evacuation zone for the Brunswick Nuclear Plant.
Cyber	**YES**	• Review of NC State Hazard Mitigation Plan	• Changing future conditions encourage the assessment of the possibility of a cyberattack with the increase in global technology
Electro-magnetic Pulse	**YES**	• Review of NC State Hazard Mitigation Plan	• Changing future conditions encourage the assessment of the possibility of an electromagnetic pulse with the increase in global technology

4.5 HAZARD IDENTIFICATION RESULTS

Table 4.4 provides a summary of the hazard identification and evaluation process noting which of the of the 24 initially identified hazards are considered significant enough for further evaluation through this Plan's risk assessment (marked with a "☑").

TABLE 4.4: SUMMARY RESULTS OF THE HAZARD IDENTIFICATION AND EVALUATION PROCESS

NATURAL HAZARDS	TECHNOLOGICAL HAZARDS
☐ Avalanche	☑ Radiological Emergency – Fixed Nuclear Facilities
☑ Drought	☑ Terrorism
☑ Hailstorm**	☑ Cyber
☑ Excessive Heat	☑ Electromagnetic
☑ Hurricane and Coastal Hazards	**OTHER HAZARDS**
☑ Flooding	☑ Hazardous Substances
☑ Lightning**	☑ Infectious Disease
☑ Nor'easter***	☑ Wildfires
☑ Tornadoes/Thunderstorms	
☑ Severe Winter Weather	
☑ Earthquakes	
☑ Dam Failure	
☑ Geological	
☑ Infectious Disease	
☐ Expansive Soils	
☑ Sinkholes	
☑ Tsunami	
☐ Volcano	
☑ Storm Surge***	
☐ Erosion	

☑ = Hazard considered significant enough for further evaluation in the Southeastern NC Regional hazard risk assessment

** = Hazard is assessed as a sub hazard under the Tornadoes/Thunderstorms hazard.

*** = Hazard is assessed as a sub-hazard under the Hurricane and Coastal Hazards section.

SECTION 5
HAZARD PROFILES

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

This section of the Plan provides a detailed assessment of the hazards identified to pose a threat to the Southeastern North Carolina Region. The remainder of this section is comprised of the following subsections.

- 5.1: Overview
- 5.2: Study Area
- 5.3: Drought
- 5.4: Excessive Heat
- 5.5: Hurricanes and Coastal Hazards
- 5.6: Tornadoes/Thunderstorms
- 5.7: Severe Winter Weather
- 5.8: Earthquakes
- 5.9: Geological Hazards (Sinkholes, Coastal Erosion)
- 5.10: Dam Failure
- 5.11: Flooding
- 5.12: Tsunamis
- 5.13: Wildfire
- 5.14: Infectious Disease
- 5.15: Hazardous Substances
- 5.16: Radiological Emergency – Fixed Nuclear Facilities
- 5.17: Terrorism
- 5.18: Cyber
- 5.19: Electromagnetic Pulse
- 5.20: Conclusions of Hazard Risk
- 5.21: Final Determinations

5.1 OVERVIEW

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the Southeastern NC Region hazard risk assessment by creating a hazard profile. Each hazard profile includes a general description of the hazard, its location and extent, notable historical occurrences and the probability of future occurrences. Each profile also includes specific items noted by members of the Southeastern NC Regional Hazard Mitigation Planning Committee as it relates to unique historical or anecdotal hazard information for the counties in the Southeastern NC Region or a participating municipality within them.

The following hazards were identified:

- **Natural**
  - Drought
  - Excessive Heat
  - Hurricanes and Coastal Hazards
  - Tornadoes/Thunderstorms
  - Severe Winter Weather
  - Earthquake
  - Dam Failure
  - Geological Hazards (Sinkholes, Coastal Erosion)
  - Flooding
  - Tsunamis
- **Other**
  - Wildfire
  - Infectious Disease
- **Technological**
  - Hazardous Substances
  - Terrorism
  - Cyber
  - Electromagnetic Pulse

5.2 STUDY AREA

The Southeastern North Carolina Region includes four counties: Brunswick, New Hanover, Onslow and Pender. **Table 5.1** provides a summary table of the participating jurisdictions within each county. In addition, **Figure 5.1** provides a base map, for reference, of the Southeastern North Carolina Region.

TABLE 5.1: PARTICIPATING JURISDICTIONS

Brunswick County	
Bald Head Island	Northwest
Belville	Oak Island
Boiling Spring Lakes	Ocean Isle Beach
Bolivia	Sandy Creek
Calabash	Shallotte
Carolina Shores	Southport
Caswell Beach	St. James
Holden Beach	Sunset Beach

Leland	Varnamtown
Navassa	
New Hanover County	
Carolina Beach	Wilmington
Kure Beach	Wrightsville Beach
Onslow County	
Jacksonville	Richlands
Holly Ridge	Swansboro
North Topsail Beach	
Pender County	
Atkinson	Surf City
Burgaw	Topsail Beach
Saint Helena	Watha

FIGURE 5.1: SOUTHEASTERN NC REGION BASE MAP

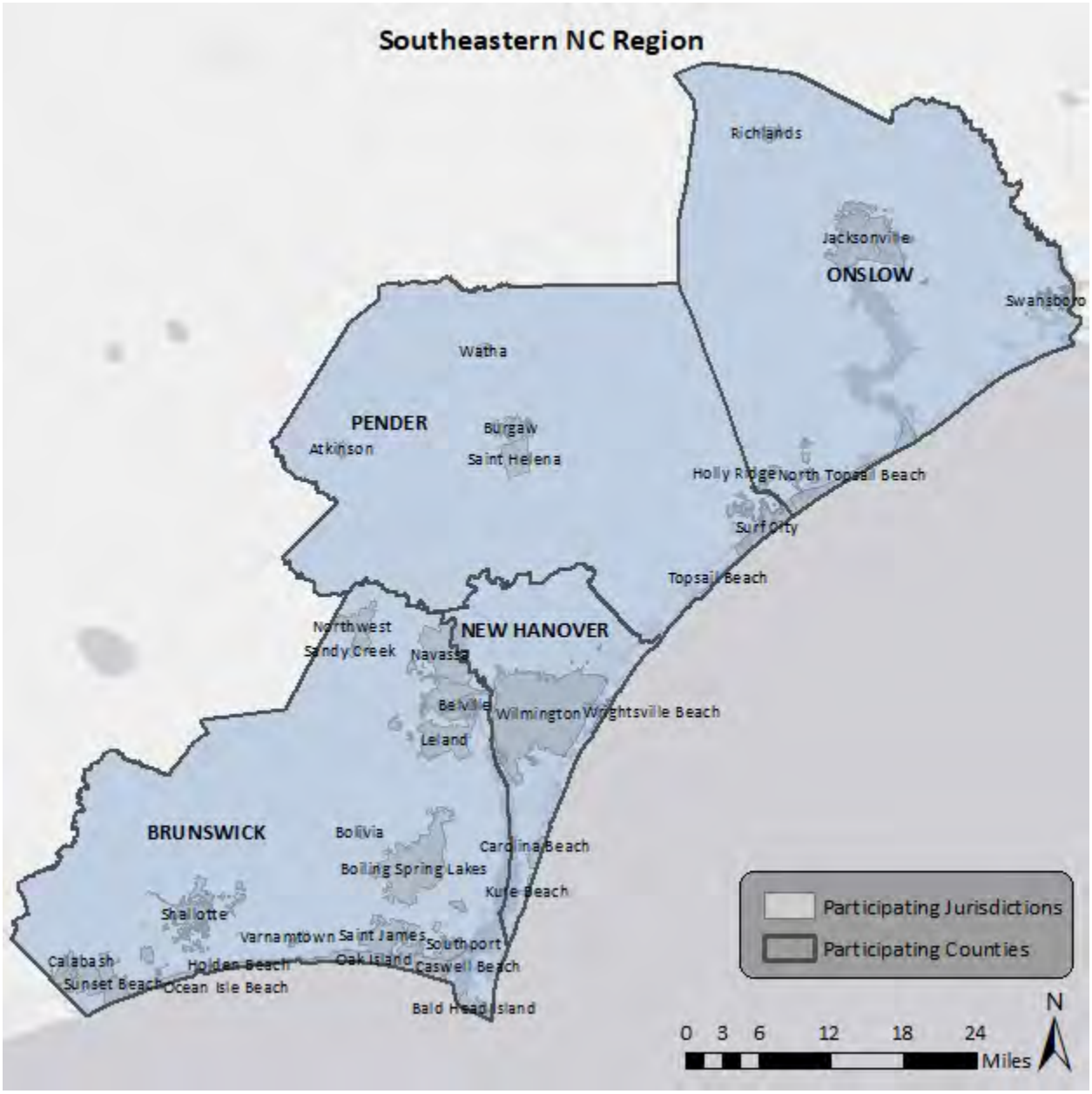


Table 5.2 lists each significant hazard for the Southeastern North Carolina Region and identifies whether or not it has been determined to be a specific hazard of concern for the municipal jurisdictions and each of the four county's unincorporated areas. This is the based on the best available data and information from the Southeastern NC Regional Hazard Mitigation Planning Committee. (● = hazard of concern)

TABLE 5.2 SUMMARY OF IDENTIFIED HAZARD EVENTS

Jurisdiction	Natural										Other		Technological			
	Drought	Excessive Heat	Hurricane and Tropical Storm	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Geological	Dam and Levee Failure	Flooding	Wildfires	Wildfires	Infectious Disease	Hazardous Substances	Terror Threat	Cyber	Electromagnetic Pulse
Brunswick County																
Bald Head Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Belville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Boiling Spring Lakes	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Bolivia	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Calabash	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Carolina Shores	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Holden Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Leland	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Navassa	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Northwest	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Oak Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ocean Isle Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Sandy Creek	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Shallotte	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Southport	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
St. James	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Sunset Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Varnamtown	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
New Hanover County																
Carolina Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Kure Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Wilmington	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Wrightsville Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Onslow County																
Atkinson	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Burgaw	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
St. Helena	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Surf City	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Topsail Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pender County																
Holly Ridge	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Jacksonville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
North Topsail Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Jurisdiction	Natural										Other		Technological			
	Drought	Excessive Heat	Hurricane and Tropical Storm	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Geological	Dam and Levee Failure	Flooding	Wildfires	Wildfires	Infectious Disease	Hazardous Substances	Terror Threat	Cyber	Electromagnetic Pulse
Richlands	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Swansboro	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Watha	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Natural Hazards

5.3 DROUGHT

5.3.1 Background and Description

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. High temperature, high winds, and low humidity can exacerbate drought conditions. In addition, human actions and demands for water resources can hasten drought-related impacts. Drought categories are based on streamflow, groundwater levels, the amount of water stored in reservoirs, soil moisture, the time of year and other relevant factors for assessing the extent and severity of dry conditions.

Droughts are typically classified into one of four types: 1) meteorological, 2) hydrologic, 3) agricultural, or 4) socioeconomic. **Table 5.3** presents definitions for these types of drought.

TABLE 5.3 DROUGHT CLASSIFICATION DEFINITIONS

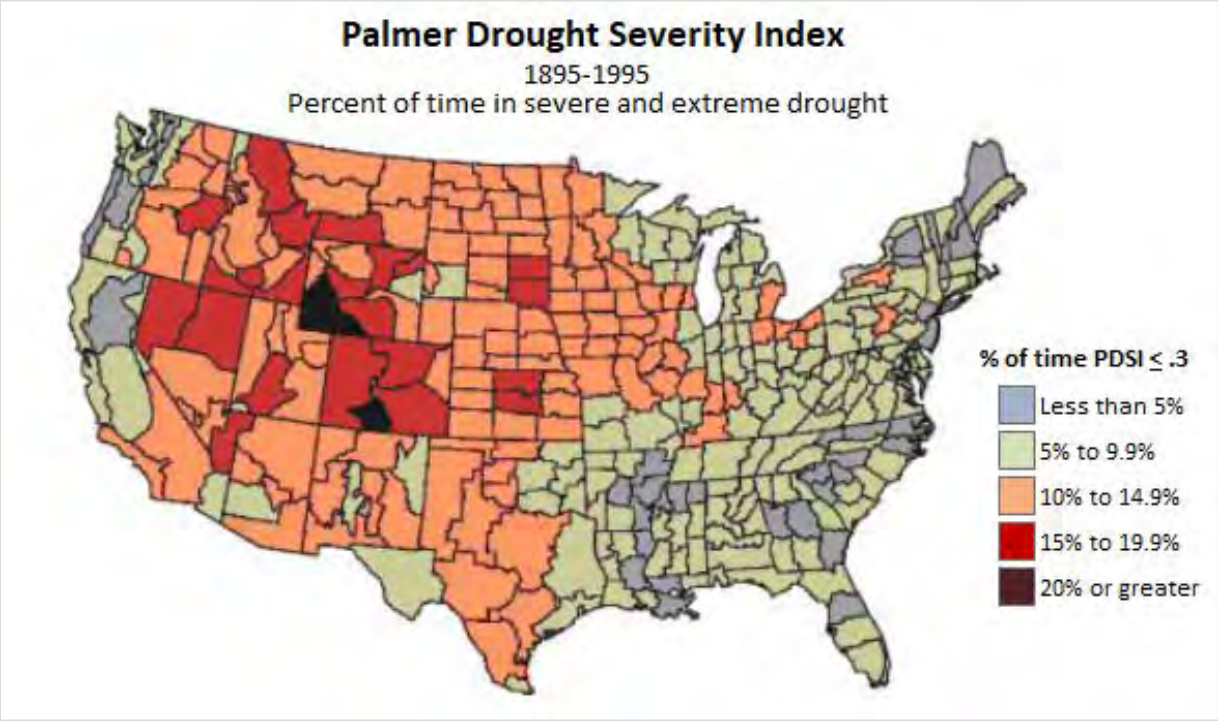
Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

Droughts are slow-onset hazards, but, over time, can have very damaging affects to crops, municipal water supplies, recreational uses, and wildlife. If drought conditions extended over a number of years, the direct and indirect economic impact can be significant.

The Palmer Drought Severity Index (PDSI) is based on observed drought conditions and range from -0.1 (incipient dry spell) to -4.0 (extreme drought). Evident in **Figure 5.2**, the Palmer Drought Severity Index Summary Map for the United States, drought affects most areas of the United States, but is less severe in the Eastern United States.

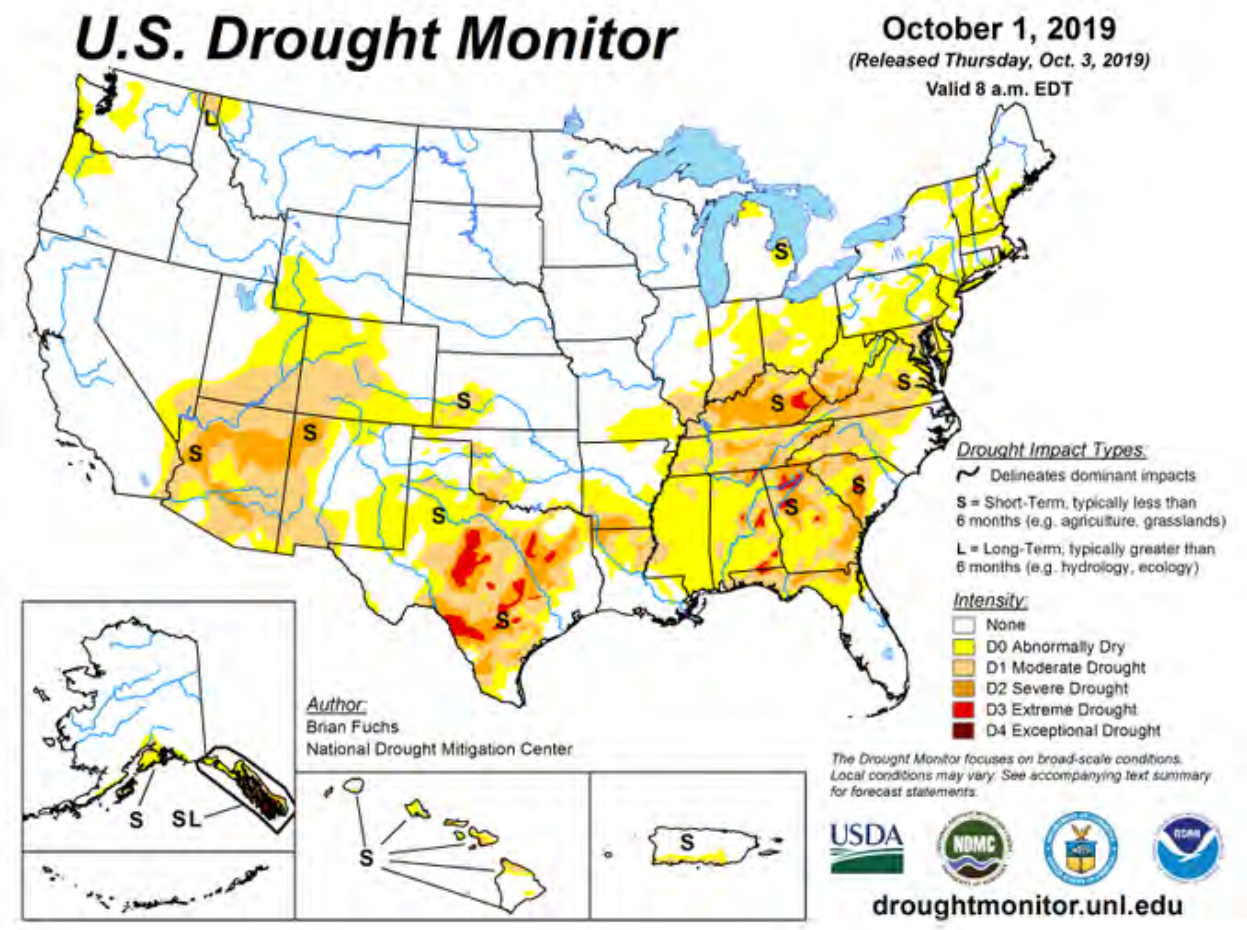
FIGURE 5.2: PALMER DROUGHT SEVERITY INDEX SUMMARY



Source: National Drought Mitigation Center

The figure above is the most updated version of the Palmer Drought Severity Index; however, the US Drought Monitor is updated on a weekly basis. An archived map from the fall of 2019 can be seen below in **Figure 5.3** to reflect more current drought conditions in the US.

FIGURE 5.3: US DROUGHT MONITOR



5.3.2 Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. According to the Palmer Drought Severity Index (**Figure 5.2**), Eastern North Carolina has a relatively high risk for drought hazard as compared to the rest of the State. However, local areas may experience much more severe and/or frequent drought events than what is represented on the Palmer Drought Severity Index map. Further, it is assumed that the Southeastern NC Region would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

5.3.3 Historical Occurrences

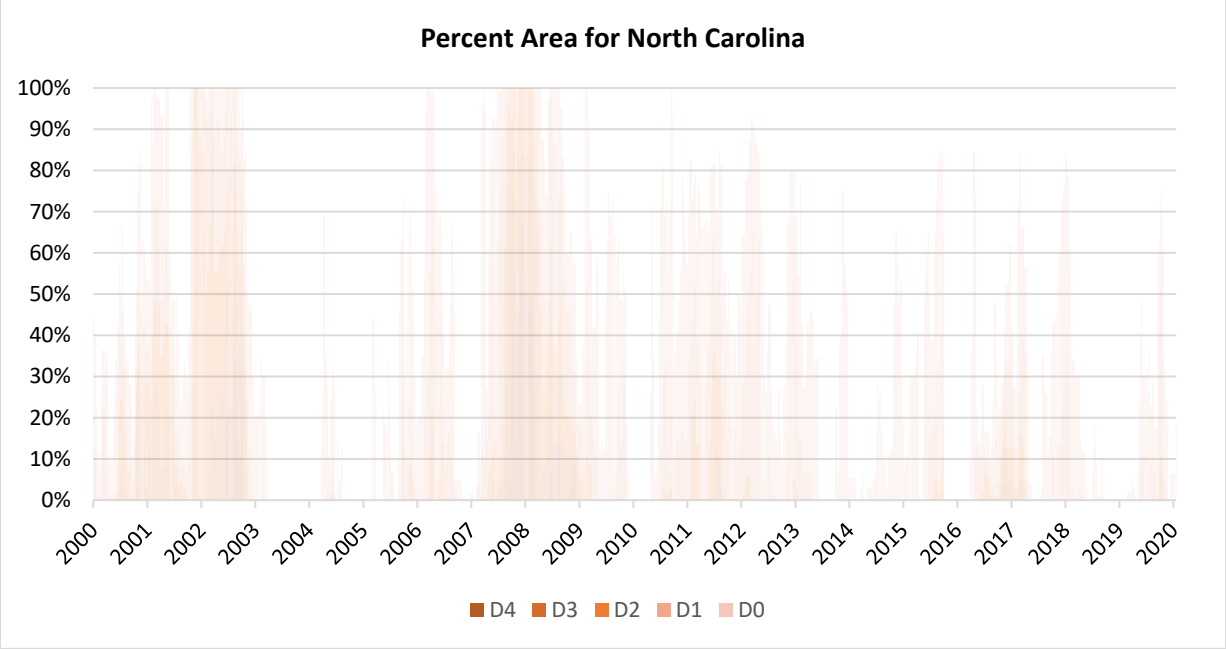
The North Carolina Drought Management Advisory Council also reports data on North Carolina drought conditions from 2000 to 2019 through the North Carolina Drought Monitor. It classifies drought conditions using the scale set by the US Drought Monitor, which classifies conditions on a scale of D0 to D4. Each class is further explained in **Table 5.4.**

TABLE 5.4: USDM DROUGHT CLASSIFICATIONS

Scale	Description	Impacts
D0	Abnormally Dry	- Short-term dryness slowing planting, growth of crops - Some lingering water deficits - Pastures or crops not fully recovered
D1	Moderate Drought	- Some damage to crops, pastures - Some water shortages developing - Voluntary water-use restrictions requested
D2	Severe Drought	- Crop or pasture loss likely - Water shortages common - Water restrictions imposed
D3	Extreme Drought	- Major crop/pasture losses - Widespread water shortages or restrictions
D4	Exceptional Drought	- Exceptional and widespread crop/pasture losses - Shortages of water creating water emergencies

Data from the North Carolina Drought Management Advisory Council and National Integrated Drought Information System (NIDIS) were used to ascertain historical drought events in the Southeastern NC Region. Since 2000, the longest duration of drought (D1-D4) in North Carolina lasted 155 weeks beginning on January 4, 2000 and ending on December 17, 2002. The most intense period of drought occurred the week of December 11, 2007 where D4 affected 66.2% of North Carolina land. **Figure 5.4** shows the percent area of North Carolina that has experiencing drought conditions from 2000 to 2020.

FIGURE 5.4: NORTH CAROLINA DROUGHT CONDITIONS (2000-2020)



Source: NIDIS, Drought.gov, US Drought Portal

According to the North Carolina Drought Monitor, at least one of the four of the counties in the Southeastern NC Region had drought occurrences (including abnormally dry) in all of the last 19 years (2001-2019) (**Table 5.5**). It should be noted that the North Carolina Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional, but a majority of the county may actually be in a less severe condition.

TABLE 5.5: SUMMARY OF DROUGHT OCCURRENCES IN THE SOUTHEASTERN NC REGION

Year	Brunswick County	New Hanover County	Onslow County	Pender County
2001	Severe Drought	Severe Drought	Severe Drought	Severe Drought
2002	Extreme Drought	Severe Drought	Severe Drought	Severe Drought
2003	Abnormally Dry	Normal	Normal	Normal
2004	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2005	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2006	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2007	Extreme Drought	Extreme Drought	Extreme Drought	Exceptional Drought
2008	Extreme Drought	Extreme Drought	Extreme Drought	Extreme Drought
2009	Moderate Drought	Abnormally Dry	Abnormally Dry	Moderate Drought
2010	Moderate Drought	Abnormally Dry	Abnormally Dry	Moderate Drought
2011	Extreme Drought	Extreme Drought	Extreme Drought	Extreme Drought
2012	Severe Drought	Severe Drought	Severe Drought	Severe Drought
2013	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2014	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2015	Abnormally Dry	Normal	Abnormally Dry	Abnormally Dry
2016	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2017	Moderate Drought	Abnormally Dry	Abnormally Dry	Abnormally Dry
2018	Moderate Drought	Normal	Abnormally Dry	Abnormally Dry
2019	Moderate Drought	Moderate Drought	Moderate Drought	Moderate Drought

Source: North Carolina Drought Monitor

According to the North Carolina Drought Management Advisory Council, the year 2007 was recorded as the driest year by the National Weather Service in more than 100 years in North Carolina and was #1 in the 2007 statewide temperature ranks. Records were set in many areas for number of days of low humidity and number of days with temperatures above 90 F[1].

As a result of the drought, 59 North Carolina counties were declared disaster areas because of crop losses by the U.S. Department of Agriculture. This included Brunswick, New Hanover, Onslow and Pender. The disaster declaration was made because of major losses for at least one major crop and significant losses on corn, soybeans, hay and pasture and other forage crops[2].

[1] North Carolina Drought Management Advisory Council Activities Report - 2008
[2] https://www.wral.com/news/local/story/3931506/

5.3.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Southeastern NC Region has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. While reports indicate that there is a much lower probability for extreme, long-lasting drought conditions.

5.4 EXCESSIVE HEAT

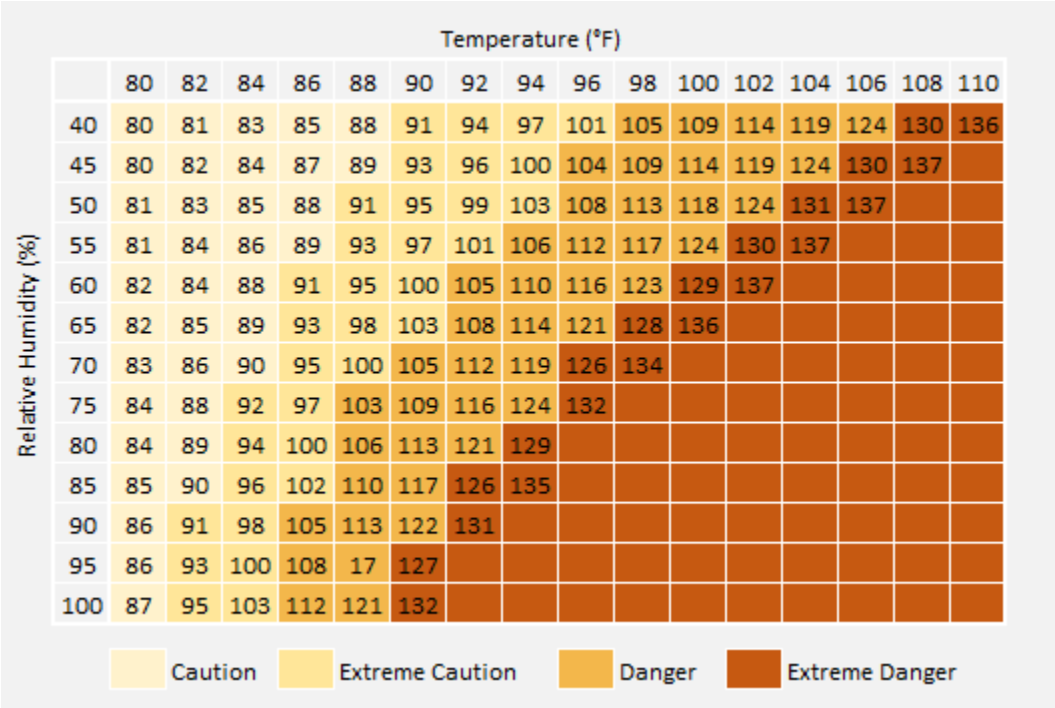
5.4.1 Background and Description

Excessive heat, like drought, poses little risk to property. However, excessive heat can have devastating effects on health. Excessive heat can often be referred to as "extreme heat" or a "heat wave." According to the National Weather Service, there is no universal definition for a heat wave, but the standard U.S. definition is any event lasting at least three days where temperatures reach ninety degrees Fahrenheit or higher. However, it may also be defined as an event at least three days long where temperatures are ten degrees greater than the normal temperature for the affected area. Heat waves are typically accompanied by humidity but may also be very dry. These conditions can pose serious health threats causing an average of 1,500 deaths each summer in the United States[3].

According to the National Oceanic and Atmospheric Administration, heat is the number one weather related killer among natural hazards, followed by frigid winter temperatures[4]. The National Weather Service devised the Heat Index as a mechanism to better inform the public of heat dangers. The Heat Index Chart, shown in **Figure 5.5**, uses air temperature and humidity to determine the heat index or apparent temperature. **Table 5.6** shows the dangers associated with different heat index temperatures. Some populations, such as the elderly and young, are more susceptible to heat danger than other segments of the population.

[3] *http://www.noaawatch.gov/themes/heat.php*
[4] *https://www.NCEI.noaa.gov/sotc/drought/201802#det-pdi*

FIGURE 5.5: NWS HEAT INDEX CHART



Source: NOAA, National Weather Service

TABLE 5.6: HEAT DISORDERS ASSOCIATED WITH HEAT INDEX TEMPERATURE

Heat Index Temperature (Fahrenheit)	Description of Risks
80°- 90°	Fatigue possible with prolonged exposure and/or physical activity
90°- 105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105°- 130°	Sunstroke, heat cramps, and heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
130° or higher	Heatstroke or sunstroke is highly likely with continued exposure

Source: National Weather Service, NOAA

In addition, NOAA has seventeen metropolitan areas participating in the Heat Health Watch/Warning System in order to better inform and warn the public of heat dangers. A Heat Health Watch is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Heat Warning is issued when an excessive heat event is expected in the next 36 hours. Furthermore, a warning is issued when the conditions are occurring, imminent, or have a high likelihood of occurrence. Urban areas participate in the Heat Health Watch/Warning System because urban areas are at greater risk to heat affects. Stagnant atmospheric conditions trap pollutants, thus adding unhealthy air to excessively hot

temperatures. In addition, the "urban heat island effect" can produce significantly higher nighttime temperatures because asphalt and concrete (which store heat longer) gradually release heat at night.

5.4.2 Location and Spatial Extent

Extreme heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire Southeastern NC Region is susceptible to extreme heat conditions.

5.4.3 Historical Occurrences

Data from the National Centers for Environmental Information was used to determine historical excessive heat and heat wave events in the Southeastern NC Region. The results are reported in **Table 5.7** below:

TABLE 5.7: EXCESSIVE HEAT OCCURRENCES (1996-2018)

County	Number of Events	Deaths/ Injuries	Property Damage (2018 dollars)
Brunswick	7	0/0	$0
New Hanover	7	0/0	$0
Onslow	2	0/0	$0
Pender	7	0/0	$0
Southeastern NC Regional Total	**23**	**0/0**	**$0**

Source: NCEI

In addition, information from the State Climate Office in North Carolina was reviewed to obtain historical temperature records in the region. Temperature information has been reported since 1890. The recorded maximum temperature for each county can be found below in **Table 5.8**:

TABLE 5.8: HIGHEST RECORDED TEMPERATURE

Location	Date	Temperature (°F)
Brunswick	8/22/1983	103
New Hanover	6/27/1952	104
Onslow	6/21/1990	104
Pender	6/21/1933	105
Southeastern NC Region Maximum	--	105

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures in various locations in the region. The most centralized location is in Wilmington International Airport (New Hanover County). **Table 5.9** shows the average maximum temperatures by month from 2017 to 2019 at the Wilmington observation station, which can be used as a general comparison for the region.

TABLE 5.9: AVERAGE MAXIMUM TEMPERATURE IN WILMINGTON INTERNATIONAL AIRPORT, WILMINGTON, NEW HANOVER COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	56.8	67.5	64.73	74.9	84.2	88.1	89.8	89.1	88.0	78.9	66.2	60.7

5.4.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Southeastern NC Region has a probability level of likely (10 to 100 percent annual probability) for future excessive heat events to impact the region.

5.5 HURRICANE AND COASTAL HAZARDS

5.5.1 Background and Description

Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six (6).

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Wind Scale (**Table 5.10**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 5.10: SAFFIR-SIMPSON WIND SCALE

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)
1	74-95	Greater than 980
2	96-110	979-965
3	111-129	964-945
4	130-156	944-920
5	157 +	Less than 920

Source: National Hurricane Center (2018)

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. **Table 5.11** describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

TABLE 5.11: HURRICANE DAMAGE CLASSIFICATIONS

Storm Category	Damage Level	Description of Damages	Photo Example
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

Sources: National Hurricane Center; Federal Emergency Management Agency

Nor'easters
The nor'easter is a particularly devasting type of coastal storm, named for the winds that blow in from the northeast and drive the storm up the US East Coast alongside the Gulf Stream, a band of warm water that lies off the Atlantic coast. They can cause substantial damage to coastal areas due to their associated strong winds and heavy surf. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful. Nor'easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding.

Rip Currents
A rip current is an extremely dangerous hazard, killing approximately 100 people each year (according to the National Weather Service). Rip currents form in the surf-zone as waves disperse. According to NOAA, waves break on the sandbar, move towards the beach and then return to the ocean through a channel. Water becomes trapped between the beach and the sandbar, causing the water to move away from the beach in a narrow, river-like channel. There are three parts to a rip current: 1) the feeder; 2) the neck; and 3) the head. The feeder current flows parallel to the shore, converging at the neck and flowing, as a rip current, towards the head. At the head, the current expands and releases slack. Rip currents are typically mushroom-shaped and brown in color due to sand being picked up. However, some may have no color at all. Rip currents also vary in size and shape.

According to the National Oceanic and Atmospheric Administration, there are four different types of rip currents including traveling, fixed, permanent, and flash.

- Flash: A flash current is short in duration (less than 10 minutes) and is enhanced by large swell. This causes unpredictable conditions where they occur.
- Permanent: This type of rip current develops along jetties, groins, and piers.
- Fixed: These rip currents are dependent upon the shape of bays, coasts, reefs, or sandbars.
- Traveling: This type of rip current forms along long beach currents which run parallel to the beach. The long beach current pushes the rip away from its original location, weakening it.

Rip currents form along coastal areas in large bodies of water including oceans and the Great Lakes. All of the coastal areas in the Southeastern NC Region are uniformly at-risk to rip currents. Further, these areas are equally susceptible to any of the four types of rip currents. The Fort Fisher revetment in New Hanover County is notorious for permanent rip current occurrences. Piers throughout the Region also have permanent rip currents. The most dangerous rip currents of any type occur during high surf when wave height and wave period are the highest.

5.5.2 Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. North Carolina's geographic location of the Atlantic Ocean and its proximity to the Gulf Stream make it prone to hurricanes. In fact, North Carolina has experienced the fourth greatest number of hurricane landfalls of any state in the twentieth century (trailing Florida, Texas and Louisiana). All areas in the Southeastern NC Region are equally susceptible to hurricane and coastal hazards.

5.5.3 Historical Occurrences

North Carolina has an extensive hurricane history dating back to colonial times. During the nineteenth century, storms occurred in 1837, 1846, 1856, 1879, 1883, and 1899. During the 1950s, North Carolina was impacted by several hurricanes, including Hazel, Connie, Diane, and Ione.

Between 1960 - 1990, there was a decrease in landfalling hurricanes, with the exception of Hurricane Donna in 1960, Hurricane Diana in 1984, and Hurricane Hugo in 1989. Recent history has included a number of hurricanes/tropical storms, including several major storms, with Emily (1993), Opal (1995), Bertha (1996), Fran (1996), Bonnie (1998), Dennis (1999), Floyd (1999), Isabel (2003), Charley (2004), Ophelia (2005), Ernesto (2006), Irene (2011), Andrea (2013), Arthur (2014), Matthew (2016), Florence (2018), and Dorian (2019) all leaving their mark on North Carolina. These storms had varying impacts on the Southeastern NC Region.

According to the National Hurricane Center's historical storm track records, 127 hurricane, tropical storm, or tropical depression tracks have passed within 75 miles of the Southeastern NC Region since 1850.[5] This includes: fifty-five (55) hurricanes; thirty-eight (38) tropical storms; and thirty-four (34) tropical depressions. Of the recorded storm events, two (2) Category 4 Hurricanes and four (4) Category 3 storms have traveled directly through the Southeastern NC Region **Table 5.12** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of the Southeastern NC Region) and Category of the storm based on the Saffir-Simpson Scale. **Figure 5.6** shows the track of each recorded storm.

TABLE 5.12 HISTORICAL STORM TRACKS WITHIN 75 MILES OF THE SOUTHEASTERN NC REGION (1850–2019)

Date of Occurrence	Storm Name	Maximum Wind Speed (Miles Per Hour)	Storm Category
8/25/1851	Not Named	115	Category 3
10/11/1852	Not Named	104	Category 2
8/28/1852	Not Named	100	Category 3
9/10/1854	Not Named	127	Category 3
9/1/1856	Not Named	115	Category 3
9/16/1858	Not Named	104	Category 2
11/2/1861	Not Named	81	Category 1
8/1/1867	Not Named	104	Category 1
10/5/1868	Not Named	81	Tropical Storm
10/7/1871	Not Named	46	Tropical Storm
10/25/1872	Not Named	58	Tropical Depression
9/20/1873	Not Named	81	Category 1
9/29/1874	Not Named	92	Tropical Storm
9/17/1876	Not Named	115	Category 1
10/27/1878	Not Named	104	Category 2
9/9/1880	Not Named	81	Category 1
10/12/1882	Not Named	138	Category 1
8/25/1885	Not Named	104	Category 1
8/24/1886	Not Named	121	Category 2
10/31/1887	Not Named	81	Category 1
8/24/1887	Not Named	127	Category 3
8/20/1887	Not Named	121	Category 3
10/11/1888	Not Named	109	Category 2
6/18/1889	Not Named	75	Category 1
10/4/1893	Not Named	132	Category 4
10/13/1893	Not Named	121	Category 3

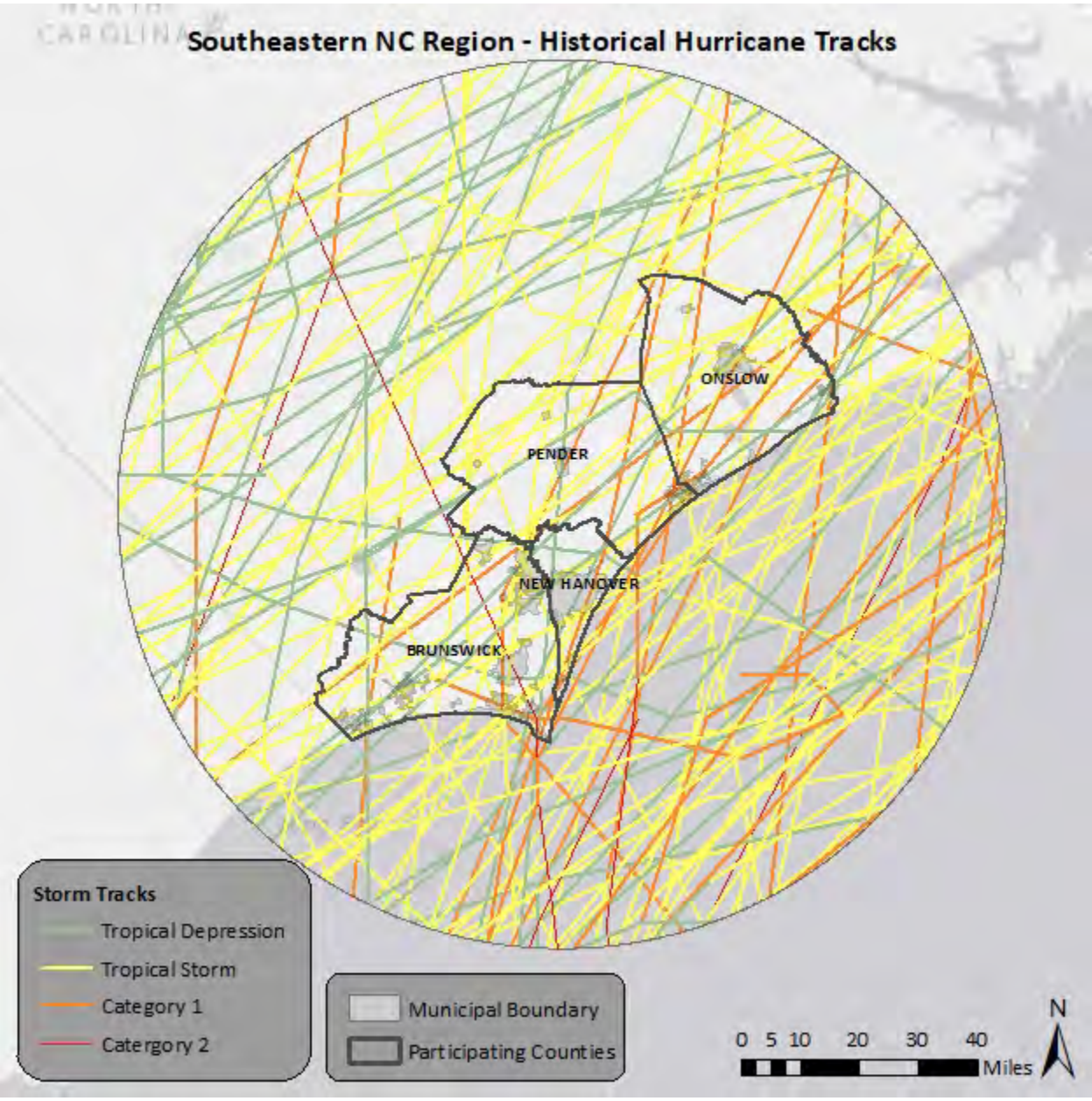
[5] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

Date of Occurrence	Storm Name	Maximum Wind Speed (Miles Per Hour)	Storm Category
6/16/1893	Not Named	75	Category 1
10/10/1894	Not Named	121	Category 3
9/28/1894	Not Named	121	Category 3
9/27/1894	Not Named	69	Tropical Storm
10/31/1899	Not Named	109	Category 3
10/6/1899	Not Named	58	Tropical Storm
10/13/1900	Not Named	109	Tropical Depression
9/18/1901	Not Named	81	Tropical Storm
7/31/1901	Not Named	81	Tropical Storm
11/4/1904	Not Named	86	Tropical Storm
9/14/1904	Not Named	86	Category 1
6/29/1907	Not Named	63	Tropical Storm
10/20/1910	Not Named	150	Category 4
10/11/1913	Not Named	75	Category 1
5/16/1916	Not Named	58	Tropical Storm
9/30/1924	Not Named	74	Tropical Storm
9/17/1924	Not Named	86	Category 1
12/2/1925	Not Named	92	Category 1
9/19/1928	Not Named	161	Category 5
9/12/1930	Not Named	155	Category 4
9/16/1932	Not Named	75	Category 1
9/8/1934	Not Named	104	Category 2
7/31/1937	Not Named	69	Tropical Storm
10/20/1944	Not Named	144	Category 4
9/14/1944	Not Named	144	Category 4
9/18/1945	Not Named	132	Category 4
6/25/1945	Not Named	98	Category 1
10/9/1946	Not Named	98	Tropical Depression
9/25/1947	Not Named	63	Tropical Depression
8/24/1949	Not Named	109	Category 2
8/28/1952	Not Named	52	Tropical Storm
10/15/1954	Hazel	132	Category 4
8/31/1954	Carol	115	Category 2
9/27/1956	Not Named	150	Tropical Depression
7/10/1959	Cindy	75	Tropical Depression
6/2/1959	Not Named	63	Tropical Depression
9/12/1960	Donna	144	Category 2
6/29/1960	Brenda	69	Tropical Storm
8/28/1962	Alma	98	Tropical Storm
9/17/1967	Doria	86	Tropical Depression
10/20/1968	Gladys	86	Category 1
8/11/1968	Dolly	81	Tropical Depression
6/12/1968	Abby	75	Tropical Depression
9/6/1969	Gerda	127	Category 1
6/28/1970	Not Named	29	Tropical Depression
5/26/1970	Alma	81	Tropical Depression
9/10/1971	Not Named	29	Tropical Depression
6/21/1972	Agnes	86	Tropical Depression
10/27/1975	Hallie	52	Tropical Storm
6/28/1975	Amy	69	Tropical Depression
6/8/1976	Not Named	35	Tropical Depression
5/24/1976	Not Named	52	Tropical Storm
9/6/1977	Clara	75	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (Miles Per Hour)	Storm Category
9/9/1977	Babe	65	Tropical Depression
7/24/1980	Not Named	35	Tropical Depression
8/20/1981	Dennis	81	Tropical Storm
6/19/1982	Not Named	69	Tropical Depression
9/30/1984	Isidore	58	Tropical Storm
8/10/1985	Claudette	86	Tropical Storm
10/14/1985	Isabel	69	Tropical Depression
11/23/1985	Kate	121	Tropical Storm
8/17/1986	Charley	81	Category 1
6/7/1986	Andrew	52	Tropical Storm
8/6/1988	Alberts	40	Tropical Depression
8/19/1991	Bob	115	Category 2
7/20/1994	Two	35	Tropical Depression
6/6/1995	Allison	75	Tropical Storm
10/8/1996	Josephine	69	Tropical Storm
7/24/1997	Danny	81	Tropical Depression
9/4/1998	Earl	98	Tropical Storm
10/18/1999	Irene	109	Category 1
9/19/2000	Gordon	81	Tropical Depression
9/23/2000	Helene	69	Tropical Storm
6/14/2001	Not Named	58	Tropical Depression
7/14/2002	Not Named	58	Tropical Depression
9/10/2002	Gustav	98	Tropical Storm
10/12/2002	Not Named	86	Tropical Depression
8/3/2004	Alex	121	Category 2
8/13/2004	Not Named	64	Tropical Depression
8/14/2004	Charley	150	Category 1
8/30/2004	Not Named	74	Tropical Depression
9/14/2005	Ophelia	86	Category 1
6/14/2006	Not Named	58	Tropical Storm
9/1/2006	Ernesto	75	Tropical Storm
6/3/2007	Not Named	58	Tropical Storm
9/6/2008	Christobal	63	Tropical Storm
7/20/2008	Hanna	86	Tropical Storm
5/27/2009	One	35	Tropical Depression
9/3/2010	Earl	144	Category 2
8/27/2011	Irene	121	Category 1
5/30/2012	Beryl	69	Tropical Storm
5/19/2012	Alberto	58	Tropical Storm
6/17/2013	Andrea	63	Tropical Storm
5/11/2015	Ana	58	Tropical Depression
6/2/2016	Bonnie	46	Tropical Depression
6/7/2016	Colin	58	Tropical Storm
9/21/2016	Julia	52	Tropical Storm
10/19/2016	Matthew	167	Category 1
9/29/2017	Ten	46	Tropical Depression
9/14/2018	Florence	138	Category 1
10/11/2018	Michael	155	Tropical Storm
9/6/2019	Dorian	110	Category 1

Source: National Hurricane Data Center

FIGURE 5.6: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF THE SOUTHEASTERN NC REGION



Source: The National Climate Data Center

The National Centers for Environmental Information reported seventeen (17) tropical storm and fifteen (15) hurricane related events in the Southeastern NC Region between 1950 and 2019. However, information from the National Hurricane Center, contained in **Table 5.12**, shows there have been a significant number of tropical storm and hurricane related events in the region. The most recent disaster

declarations for the region were made in 2019 (Hurricane Dorian), 2018 (Hurricane Florence), 2016 (Hurricane Matthew), and 2011 (Hurricane Irene)[6].

Below are brief descriptions of several storms in recent history which had a significant impact on the region.

Hurricane Bertha - July 5 to July 12, 1996
Hurricane Bertha formed on July 5, 1996. As a Category One hurricane, Bertha moved across the northeastern Caribbean. The storm's highest sustained winds reached 115 mph north of Puerto Rico. Bertha made landfall near Wilmington on July 12 as a Category Two hurricane, with estimated winds of 105 mph. Bertha claimed two lives in North Carolina and did substantial damage to agricultural crops and forestland. Storm surge flooding and beach erosion were severe along the coast. Damages were estimated to exceed $60 million for homes and structures, and over $150 million for agriculture. Corn, tobacco, and other crops received severe damage from the storm. Rainfall totals of over 5 inches were common in eastern North Carolina, resulting in widespread flooding and power outages. The Southeastern NC Region experienced approximately $17,500,000 in crop damage and $27,000,000 in property damage.

Hurricane Fran – August 23 to September 5, 1996
Hurricane Fran was the most destructive hurricane of the 1996 season. The storm was created on August 23, reaching hurricane status on August 29, while about 450 miles to the northeast of the Leeward Islands. It strengthened to a Category Three hurricane northeast of the central Bahamas on September 4. Hurricane Fran, with winds estimated at 115 mph, made landfall over Cape Fear on the evening of September 5, then continued northward over the eastern United States causing widespread damage. Fran was responsible for 34 deaths overall (24 in North Carolina alone), mostly caused by flash flooding in the Carolinas, Virginia, West Virginia, and Pennsylvania.

The storm surge on the North Carolina coast destroyed or seriously damaged thousands of beach front structures. Immediately following the storm, nearly 1.8 million people were without electrical power. Most electrical service was restored within 8-10 days. In Brunswick County, storm surge was around 6 feet, with beach erosion around 15 feet on the eastern islands. Seven beach houses on the east end of Holden Beach were damaged or destroyed. The storm passed through New Hanover County with winds gusting around 110 mph, storm surge 12 feet above mean sea level (MSL), and 40 foot beach erosion destroying most docks and piers. Pleasure Island was hardest hit, as 25 homes were carried off foundations and many others badly damaged. Wrightsville Beach was not hit as hard, but 15 homes were at least 75% damaged. In Wilmington, 14 homes were destroyed and 385 homes suffered major damage. In Pender County, a 12-foot storm surge on Topsail Island caused 40 feet of beach erosion and wiped out dunes as overwash destroyed most of the first row of beach houses and heavily damaged the rest. More than 890 businesses and 30,000 homes were damaged by the storm which also damaged or destroyed 8.25 million acres of forest. The damage in North Carolina alone was estimated at $5.2 billion. The Southeastern NC Region experienced approximately $385,000,000 in property damage, $49,000,000 in crop damages, and two (2) deaths. The agricultural damage was the greatest in Pender County.

Hurricane Bonnie - August 19 to 30, 1998
Hurricane Bonnie originated as a tropical wave over Africa. It slowly increased speed and made its way across the Atlantic, near the Leeward Islands and then Hispaniola. It made landfall near Wilmington as a

[6] All of the participating counties were declared disaster areas for these particular storms. A complete list of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.

border Category 2/3 hurricane with approximately 115 mph winds and a diameter of 400 miles on August 27, 1998. Rainfall totals between 8-11 inches were recorded in portions of eastern North Carolina. Storm surge ranged from 5-8 feet with most barrier island overwash from the sound side, not the ocean side. The storm slowly moved off land on August 28, 1998. In its wake, the total damage was estimated in the $1 billion range. There was an estimated $360 million in insured property damage, including $240 million in North Carolina alone. The Southeastern NC Region experienced approximately $72,200,000 in property damage.

Hurricane/Tropical Storm Dennis - August 24 to September 7, 1999
Hurricane Dennis developed over the eastern Bahamas on August 26, 1999, and drifted parallel to the southeastern United States from the 26th to the 30th. The center of Dennis approached to within 60 miles of the Carolina coastline on August 30th as a strong Category 2 hurricane. Although, the storm never made landfall, rainfall amounts approached ten inches in coastal southeastern North Carolina and beach erosion was substantial. Dennis made a return visit in September as a tropical storm, moving west-northwest through eastern and central North Carolina and then lingering off the coast for several days.

For most counties, Tropical Storm Dennis left relatively little in its wake although on the Outer Banks beach erosion and the storm tide effects were extreme. Unfortunately, the hurricane approached eastern North Carolina during one of the highest astronomical tides of the month. For almost a week after Tropical Storm Dennis made landfall, associated rain fell on inland counties. This allowed most of the rivers to rise above flood stage which set the stage for the next hurricane, Hurricane Floyd and its associated record flooding.

Hurricane Floyd - September 7 to 18, 1999
Hurricane Floyd brought flooding rains, high winds, and rough seas to a good portion of the United States coastline from September 14th through the 18th. Although Hurricane Floyd reached Category 4 intensity in the Bahamas, it weakened to a Category 2 hurricane by the time it made landfall in North Carolina. Due to Floyd's large size, heavy rainfall covered a larger area and lasted longer than a typical Category 2 storm. Flooding caused major problems across the region resulting in at least 77 deaths and damages estimated in the billions. In North Carolina alone, 7,000 homes were destroyed; 17,000 homes were inhabitable; and 56,000 homes were damaged.

Extreme flooding was experienced across most counties. Inland flooding exceeded Hurricane Bertha, Fran, Bonnie, and Dennis combined. Most counties reported their worst flooding ever. The Northeast Cape Fear River had the worst flood of the century, while the Black River flood was the worst since 1945. Unbelievable numbers of homes were covered with water and over half a million customers throughout the warning area were without power. High water closed most roads, including US 17, isolating many areas. A dam failed at Boiling Spring Lakes, inundating the area. In Pender County, more than 3,000 hogs, 90,000 turkeys, and 200 cows were lost due to drowning. Animal waste and septic tanks added pollution to the flooding. Two human fatalities occurred as motorists drove into flooded parts of highways. Unofficially the flooding from Hurricane Floyd has been compared to a 500-year flood.

Hurricane Isabel - September 6 to 19, 2003
Hurricane Isabel began her path to the east coast of the United States as a tropical storm around September 6, 2003. On September 7th, Isabel was upgraded to a hurricane with 90 mile per hour (mph) sustained winds. By September 8th, Isabel became the third major hurricane of the year at a Category 4

with winds reaching almost 135 mph. Isabel continued her path towards the east coast with a well-formed eye and catastrophic winds that eventually reached 160 mph on September 11, 2003. According to the National Oceanic and Atmospheric Administration (NOAA), at that point Isabel's hurricane force winds extended 60 miles out from the center and tropical storm force winds extended approximately 185 miles out. The storm began to weaken and on September 16th was reduced to a Category 2. Large ocean swells and dangerous surf were experienced from South Carolina to New Jersey.

The hurricane made landfall on September 19th along the southern Outer Banks. Widespread power outages were experienced in eastern North Carolina and Virginia. The fringe of Isabel's circulation caused offshore winds gusting near 60 mph along the beaches of Pender, New Hanover, and Brunswick counties. Damage was minimal, mainly to scattered tree limbs and some roof shingles. Beach erosion damaged a roadway on Bald Head Island in Brunswick County.

Hurricane Ophelia - September 6 to September 17, 2005

Category one Hurricane Ophelia, with maximum sustained winds of 85 mph, approached the North Carolina coast on the September 13th. The hurricane remained offshore brushing the southern coastal counties of North Carolina on the September 14th and 15th. The large eyewall (50 miles in diameter) was over New Hanover, Pender, and Brunswick counties with hurricane strength wind gusts reported at Wrightsville Beach. There were unofficial reports of wind gusts to 84 mph at Bald Head Island and Kure Beach. Rainfall was heaviest in the eastern portion of Brunswick County. Average rainfall over the Southeastern NC Region ranged from 6 to 10 inches. The storm continued to track slowly northeast. Ophelia brushed by Outer Banks Hyde and Dare counties on the September 16th with hurricane force wind gusts. Damage over the Southeastern NC Region was mainly minor roof damage and flooding. There were moderate reports of downed trees and the utility company reported over 51,000 people without power at the height of the storm. Beach erosion was also a problem. A longshore current gouged a five (5) foot escarpment along the coast of New Hanover and Pender counties. Damage to the area and the cost for clean up was $6 million for Pender and New Hanover counties, with $2.3 million for Brunswick County. Most of the money went to the clean up of storm debris.

Hurricane Irene - August 26 to 27, 2011

Hurricane Irene made landfall during the morning of the 27th, near Cape Lookout, as a large Category 1 hurricane. Due to the large size of the hurricane, strong damaging winds, major storm surge, and flooding rains were experienced across much of eastern North Carolina. Several destructive tornados occurred during the evening of the 26th associated with the hurricane. Millions of dollars in damages were reported across the area. Property and crop damages were estimated to be 209 million dollars. Storm surge damages were estimated at 420 million dollars. Across the Southeastern NC Region, winds gusting as high as 60 mph resulted in downed trees and power lines with power outages. Rainfall amounts across the Region ranged from three to over eight inches resulting in flooding of roads and low-lying areas. The Southeastern NC Region experienced approximately $4.35 million in property damage.

Hurricane Matthew – October 8, 2016

Hurricane Matthew was an extraordinarily severe and sustained event that brought record-level flooding to many areas in eastern North Carolina's coastal plain, sound, and coastal communities. Hurricane Matthew hit North Carolina on October 8, 2016, as a Category 1 storm. Communities were devastated by this slow-moving storm primarily by widespread rainfall. During a 36-hour period, up to 18 inches of heavy

rainfall inundated areas in central and eastern North Carolina. Riverine flooding began several days after Hurricane Matthew passed and lasted for more than two weeks. New rainfall records were set in 17 counties in the Tar, Cape Fear, Cashie, Lumber, and Neuse River watersheds. Entire towns were flooded as water levels throughout eastern North Carolina crested well above previously seen stages. During the peak of the hurricane, 800,000 households lost power and 635 roads were closed, including a section of I-40 West in Johnston County that was closed for seven days, and sections of I-95 North and South in Robeson and Cumberland Counties that were closed for 10 days. Approximately 88,000 homes were damaged and 4,424 residences were completely destroyed. Losses totaled more than $967 million, representing an economic loss as high as 68 percent of the damages, or $659 million, not expected to be covered by insurance or FEMA assistance.

Hurricane Florence – September 14 to 17, 2018

Hurricane Florence was a powerful and long-lived Cape Verde hurricane that caused catastrophic damage in the Carolinas in September 2018. As it made landfall in Wrightsville Beach, North Carolina on September 14th, Florence was reduced in power to a Category 1 on the Saffir-Simpson scale. The storm dropped a record level of rain across the entire state. On September 17th, Florence had dropped 33.90 inches of rain and estimated to have caused between $2.8 – 5 billion in damages across the affected area.

Rip Currents

A total of thirty-nine (39) rip current events have been documented by the National Centers for Environmental Information in the Southeastern NC Region from 1997 to 2019 (see Appendix H for detailed descriptions of hazard events) resulting in twenty-two (22) deaths and eleven (11) injuries. The probability of future rip current occurrences is “likely.” This hazard occurs naturally along the shorelines of the Southeastern NC Region. Inclement weather conditions may increase the severity of this hazard. This is a very dangerous natural hazard in the Southeastern NC Region that, unlike other hazards, only affects life instead of property. Therefore, no vulnerability assessment will be performed in Section 6, Vulnerability Assessment.

Storm Surge

There have been eight (8) storm surge events recorded by NCEI for the Southeastern NC region since 1996. These events resulted in $8,000,000 dollars in damages according to those reports. Storm surge generally occurs with most coastal storms (hurricanes, tropical storms, nor’easters).

5.5.4 Probability of Future Occurrences

Given the coastal location of the region, it is more than likely to be affected by a significant number of hurricanes and tropical storms. Further, there is a high probability that the region will be affected by powerful coastal storms due to its proximity to the Atlantic Ocean and Gulf Stream. Coastal storm events are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe erosion and coastal flooding. Based on historical evidence, the probability level of future occurrence is likely (10-100% annual probability).

5.6 TORNADOES/THUNDERSTORMS

For the purpose of maintaining consistency with the State of North Carolina Hazard Mitigation Plan, this section will assess tornadoes and thunderstorms, which also include hailstorms and lightning.

5.6.1 Background and Description

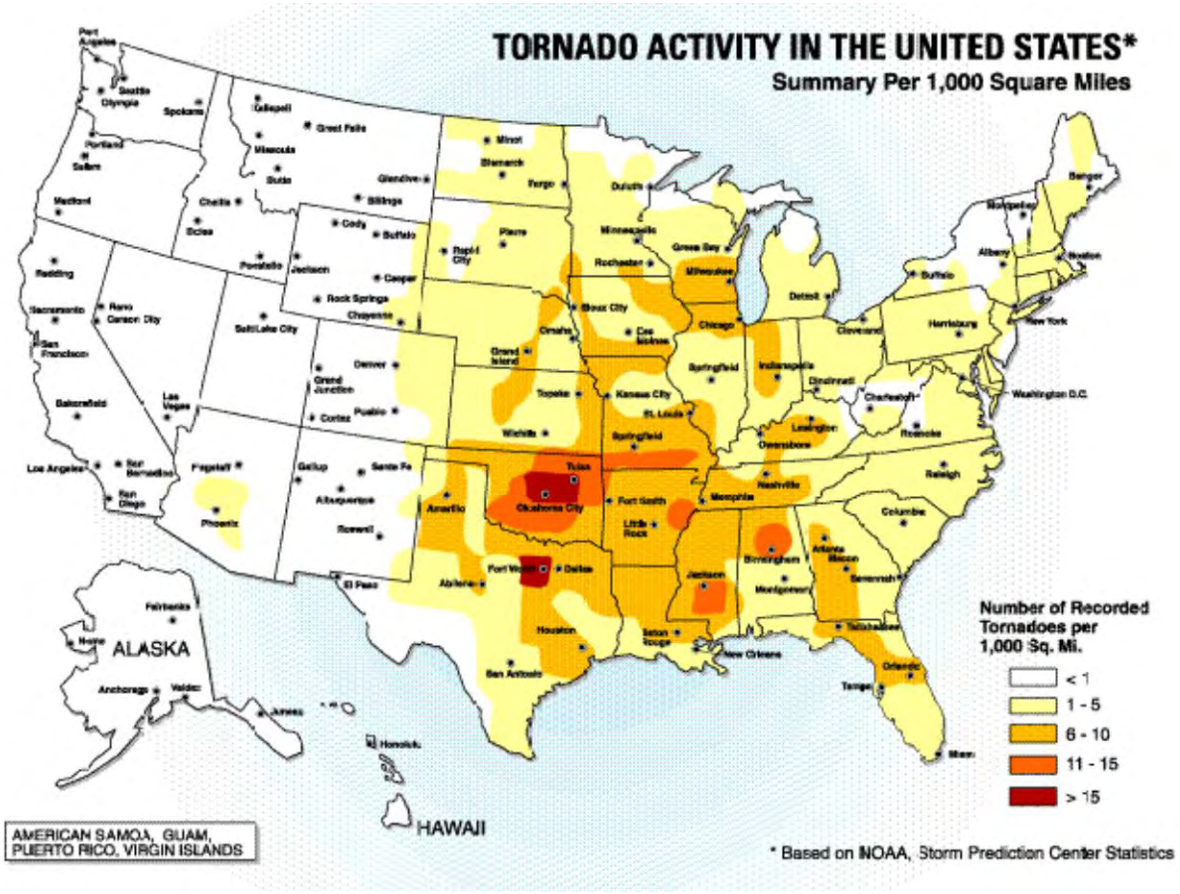
Tornado

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 miles per hour to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries.[7] According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of "tornado alley"), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). **Figure 5.7** shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

[7] NOAA, 2009

FIGURE 5.7: TORNADO ACTIVITY IN THE UNITED STATES



Tornadoes are more likely to occur during the months of March through May and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings (particularly mobile homes). Tornadic magnitude is reported according to the Fujita and Enhanced Fujita Scales. Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (**Table 5.13**). Tornado magnitudes that were determined in 2005 and later were determined using the Enhanced Fujita Scale (**Table 5.14**).

TABLE 5.13: THE FUJITA SCALE (EFFECTIVE PRIOR TO 2005)

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies

Source: National Weather Service

TABLE 5.14 THE ENHANCED FUJITA SCALE (EFFECTIVE 2005 AND LATER)

EF-SCALE NUMBER	INTENSITY PHRASE	3 SECOND GUST (MPH)	TYPE OF DAMAGE DONE
0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
1	MODERATE	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
2	SIGNIFICANT	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
5	INCREDIBLE	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Source: National Weather Service

Thunderstorms

Thunderstorms can produce a variety of accompanying hazards including wind (discussed here), hail, and lightning[8]. Although thunderstorms generally affect a small area, they are very dangerous and may cause substantial property damage.

Three conditions need to occur for a thunderstorm to form. First, it needs moisture to form clouds and rain. Second, it needs unstable air, such as warm air that can rise rapidly (this often referred to as the "engine" of the storm). Third, thunderstorms need lift, which comes in the form of cold or warm fronts, sea breezes, mountains, or the sun's heat. When these conditions occur simultaneously, air masses of varying temperatures meet, and a thunderstorm is formed. These storm events can occur singularly, in lines, or in clusters. Further, they can move through an area very quickly or linger for several hours.

According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10 percent of these storms are classified as "severe". A severe thunderstorm occurs when the storm produces at least one of these three elements: 1) Hail of three-quarters of an inch; 2) Tornado; 3) Winds of at least 58 miles per hour.

[8] Lightning and hail hazards are discussed as separate hazards in this section.

Thunderstorm events have the capability of producing straight-line winds that can cause severe destruction to communities and threaten the safety of a population. Such winds events, sometimes separate from a thunderstorm event, are common throughout the Southeastern NC Region.

Hailstorms

Hailstorms are a potentially damaging outgrowth of severe thunderstorms (thunderstorms are discussed separately in Section 5.7). Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop to a sufficient weight and fall as precipitation. Hail typically takes the form of spheres or irregularly-shaped masses greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size.

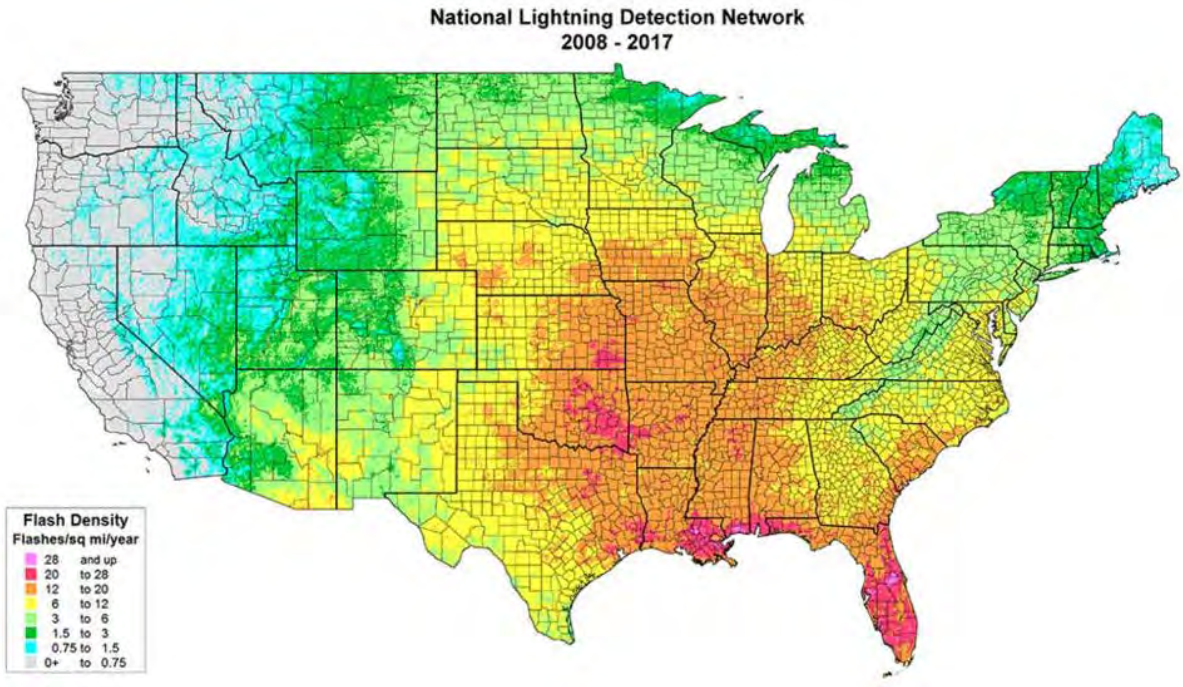
Lightning

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Lightning strikes occur in very small, localized areas. For example, they may strike a building, electrical transformer, or even a person. According to FEMA, lightning injures an average of 300 people and kills 80 people each year in the United States. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities and infrastructure largely by igniting a fire. Lightning is also responsible for igniting wildfires that can result in widespread damages to property.

Figure 5.8 shows a lightning flash density map for the years 2008-2017 based upon data provided by Vaisala's U.S. National Lightning Detection Network (NLDN®).

FIGURE 5.8: LIGHTNING FLASH DENSITY IN THE UNITED STATES



Source: Vaisala U.S. National Lightning Detection Network

5.6.2 Location and Spatial Extent

Tornado

Tornadoes occur throughout the state of North Carolina, and thus in the Southeastern NC Region. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Southeastern NC Region is uniformly exposed to this hazard.

Thunderstorm

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Southeastern NC region typically experiences several straight-line wind events each year. These wind events can and have caused extensive damage. It is assumed that the Southeastern NC Region has uniform exposure to a thunderstorm event and/or straight-line winds and the spatial extent of an impact would be potentially large.

Hailstorm

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the Southeast NC Region is uniformly exposed to severe thunderstorms; therefore, all areas of the region are equally exposed to hail which may be produce by such storms.

Lightning

It is assumed that all of the Southeastern NC Region is uniformly exposed to lightning. Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the Southeastern NC Region is uniformly exposed to lightning.

5.6.3 Historical Occurrences

Hailstorm

According to the National Centers for Environmental Information, 536 recorded hailstorm events have affected the Southeastern NC Region since 1966.[9] **Table 5.15** is a summary of the hail events in the Southeastern NC Region. **Appendix F** provides detailed information about each event that occurred in the county. Although hail can occur anywhere, In all, hail occurrences resulted in over $74 thousand in property damages, most of which were reported in Brunswick County. Hail ranged in diameter from 0.75 inches to 2.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment, so it is likely that damages are greater than the reported value. Further, a single storm event may have affected multiple counties.

TABLE 5.15: SUMMARY OF HAIL OCCURRENCES

Location	Number of Occurrences	Deaths/Injuries	Property Damage
Brunswick County	**132**	**0/0**	**$39,650**
Bald Head Island	0	0/0	$0
Belville	0	0/0	$0
Boiling Spring Lakes	0	0/0	$0
Bolivia	7	0/0	$250
Calabash	3	0/0	$1000
Carolina Shores	0	0/0	$0
Holden Beach	5	0/0	$0
Leland	25	0/0	$0
Navassa	0	0/0	$0
Northwest	0	0/0	$0
Oak Island	0	0/0	$0
Ocean Isle Beach	0	0/0	$0
Sandy Creek	0	0/0	$0
Shallotte	6	0/0	$0
Southport	8	0/0	$0
St. James	0	0/0	$0
Sunset Beach	0	0/0	$0
Varnamtown	0	0/0	$0
Unincorporated Area	78	0/0	$38,500
New Hanover County	**105**	**0/0**	**$17,450**
Carolina Beach	46	0/0	$3000.00
Kure Beach	1	0/0	$0
Wilmington	7	0/0	$0
Wrightsville	0	0/0	$0

[9] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional hail events have affected the Southeastern NC Region. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

Location	Number of Occurrences	Deaths/Injuries	Property Damage
Unincorporated Area	51	0/0	$14,450.00
Onslow County	**184**	**0/0**	**$0**
Holly Ridge	3	0/0	$0
Jacksonville	21	0/0	$0
North Topsail Beach	1	0/0	$0
Richlands	11	0/0	$0
Swansboro	10	0/0	$0
Unincorporated Area	138	0/0	$0
Pender County	**115**	**0/0**	**$17,250**
Atkinson	5	0/0	$3000
Burgaw	9	0/0	$500
St. Helena	0	0/0	$0
Surf City	2	0/0	$0
Topsail Beach	0	0/0	$0
Wartha	9	0/0	$0
Unincorporated Area	90	0/0	$13,850
SOUTHEASTERN NC REGION TOTAL	**536**	**0/0**	**$74,350.00**

Source: National Centers for Environmental Information

Lightning

According to the National Centers for Environmental Information, there have been a total of seventy-nine (79) recorded lightning events in the Southeastern NC Region since 1996.[10] These events resulted in over $4,812,500 in damages, as listed in summary **Table 5. 16**. Further, lightning caused five (5) fatalities and sixteen (16) injuries throughout the Southeastern NC Region. Detailed information on historical lightning events can be found in **Appendix F.**

TABLE 5.16: SUMMARY OF LIGHTNING OCCURRENCES

Location	Number of Occurrences	Property Damage (2018)	Deaths/Injuries
Brunswick County	**27**	**$1,345,000**	**1/2**
Bald Head Island	0	$0	0/0
Belville	0	$0	0/0
Boiling Spring Lakes	0	$0	0/0
Bolivia	0	$0	0/0
Calabash	0	$0	0/0
Carolina Shores	0	$0	0/0
Holden Beach	1	$700,00	0/0
Leland	2	$25,000	0/0
Navassa	0	$0	0/0
Northwest	0	$0	0/0
Oak Island	0	$0	0/0
Ocean Isle Beach	0	$0	0/0
Sandy Creek	0	$0	0/0
Shallotte	3	$115,000	1/0
Southport	3	$27,000	0/0

[10] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional lightning events have occurred in the Southeastern NC Region. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

	St. James	0	$0	0/0
	Sunset Beach	0	$0	0/0
	Varnamtown	0	$0	0/0
	Unincorporated Area	18	$1,108,000	0/2
New Hanover County		**35**	**$1,086,000**	**2/3**
	Carolina Beach	3	$0	0/0
	Kure Beach	0	$0	0/0
	Wilmington	13	$357,000	0/0
	Wrightsville	0	$100,000	1/1
	Unincorporated Area	19	$629,000	1/2
Onslow County		**5**	**$2,007,500**	**1/1**
	Holly Ridge	0	$0	0/0
	Jacksonville	1	$2,000,000	0/0
	North Topsail Beach	0	$0	0/0
	Richlands	0	$0	0/0
	Swansboro	1	$2,000	0/0
	Unincorporated Area	3	$5,500	1/1
Pender County		**12**	**$374,000**	**1/10**
	Atkinson	0	$0	0/0
	Burgaw	2	$45,000	0/0
	St. Helena	0	$0	0/0
	Surf City	2	$10,000	0/0
	Topsail Beach	1	$0	1/4
	Watha	0	$0	0/0
	Unincorporated Area	7	$132,000	0/6
Southeastern NC Regional Total		**79**	**$4,812,500**	**5/16**

Source: National Centers for Environmental Information

Thunderstorm

According to NCEI, there have been 581 reported thunderstorm wind events in the Southeastern NC Region since 1956[11]. These events caused over $5.7 million in damages. There was 13 reported injuries but no fatalities associated with these thunderstorm events in the Southeastern NC Region. **Table 5.17** summarizes this information. **Appendix H** presents detailed thunderstorm event reports including date, magnitude, and associated damages for each event.

TABLE 5.17: SUMMARY OF THUNDERSTORM OCCURRENCES

Location		Number of Occurrences	Deaths/Injuries	Property Damage
Brunswick County		**134**	**0/1**	**$680,500**
	Bald Head Island	0	0/0	
	Belville	0	0/0	
	Boiling Spring Lakes	0	0/0	
	Bolivia	3	0/0	
	Calabash	0	0/0	
	Carolina Shores	0	0/0	
	Holden Beach	2	0/1	
	Leland	11	0/0	
	Navassa	0	0/0	

[11] These thunderstorm events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is likely that additional events have occurred in the Southeastern NC Region. As additional local data becomes available, this hazard profile will be amended.

Location	Number of Occurrences	Deaths/Injuries	Property Damage
Northwest	0	0/0	
Oak Island	0	0/0	
Ocean Isle Beach	1	0/0	
Sandy Creek	0	0/0	
Shallotte	2	0/0	
Southport	10	0/0	
St. James	0	0/0	
Sunset Beach	1	0/0	
Varnamtown	0	0/0	
Unincorporated Area	104	0/0	
New Hanover County	**140**	**0/5**	**$1,935,000**
Carolina Beach	0	0/0	
Kure Beach	2	0/0	
Wilmington	38	0/1	
Wrightsville	0	0/0	
Unincorporated Area	100	0/4	
Onslow County	**178**	**0/0**	**$286,090**
Holly Ridge	0	0/0	
Jacksonville	13	0/0	
North Topsail Beach	3	0/0	
Richlands	9	0/0	
Swansboro	11	0/0	
Unincorporated Area	142	0/0	
Pender County	**129**	**0/7**	**$2,870,000**
Atkinson	4	0/0	
Burgaw	17	0/0	
St. Helena	0	0/0	
Surf City	8	0/0	
Topsail Beach	0	0/0	
Watha	7	0/0	
Unincorporated Area	93	0/7	
Southeastern NC Region Total	**581**	**0/13**	**$5,753,590**

Tornado

According to the National Centers for Environmental Information, there have been a total of one hundred and thirty-one (131) recorded tornado events in the Southeastern NC Region between 1951 and December 2018 (**Table 5.18**), resulting in nearly $25,000,000 in property damages.[12] In addition, six deaths and ninety-nine injuries were reported. It is important to note that only tornadoes that

[12] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional tornadoes have occurred in the Southeastern NC Region. As additional local data becomes available, this hazard profile will be amended.

have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 67 years.

TABLE 5.18: SUMMARY OF TORNADO OCCURRENCES IN THE SOUTHEASTERN NC REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage
Brunswick County	**27**	**0/1**	**$886,500**
Bald Head Island	1	0/0	$0
Belville	0	0/0	$0
Boiling Spring Lakes	0	0/0	$0
Bolivia	0	0/0	$0
Calabash	0	0/0	$0
Carolina Shores	0	0/0	$0
Holden Beach	1	0/0	$10000
Leland	2	0/0	$2000
Navassa	0	0/0	$0
Northwest	0	0/0	$0
Oak Island	0	0/0	$0
Ocean Isle Beach	0	0/0	$0
Sandy Creek	0	0/0	$0
Shallotte	2	0/0	$0
Southport	1	0/0	$0
St. James	0	0/0	$0
Sunset Beach	0	0/0	$0
Varnamtown	0	0/0	$0
Unincorporated Area	20	0/1	$874,500
New Hanover County	**26**	**0/8**	**$3,631,500**
Carolina Beach	1	0/0	$3000
Kure Beach	0	0/0	$0
Wilmington	8	0/4	$470,000
Wrightsville	0	0/0	$0
Unincorporated Area	17	0/4	$1,342,750
Onslow County	**45**	**3/59**	**$15,421,250**
Holly Ridge	0	0/0	$0
Jacksonville	7	0/0	$130,000
North Topsail Beach	0	0/0	$0
Richlands	4	0/7	$2,045,000
Swansboro	1	0/0	$10,000
Unincorporated Area	33	3/52	$13,236,250
Pender County	**33**	**3/31**	**$4,486,000**
Atkinson	4	0/0	$249,000
Burgaw	2	0/0	$50,000
St. Helena	0	0/0	$0
Surf City	2	0/0	$10,000
Topsail Beach	0	0/0	$0
Watha	1	0/0	$35,000
Unincorporated Area	24	3/31	$4,142,000
Southeastern NC REGION TOTAL	**131**	**6/99**	**$24,425,250**

Source: National Centers for Environmental Information

5.6.4 Probability of Future Occurrences

Tornado

According to historical information, tornado events are not an annual occurrence for the region. However, given the region's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events are small in terms of size, intensity, and duration, there is the potential for strong tornadoes in the region. The probability of future tornado occurrences affecting the Southeastern NC is possible (1 to 10 percent annual probability).

Thunderstorm

Given the high number of previous events, it is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire planning area.

Hailstorm

Given that severe thunderstorm events will remain a frequent occurrence for the Southeastern NC Region, the probability of future hail occurrences is highly likely (100 percent annual probability). It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the region. Further, hail is an atmospheric hazard, so it is assumed that the entire Southeastern NC Region has equal exposure to this hazard.

Lightning

Although there was not a high number of historical lightning events reported throughout the Southeastern NC Region via NCEI data, it is understood that lightning occurs with most severe thunderstorm events, even if it goes unreported to NCEI. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the Southeastern NC Region is located in an area of the country that experienced an average of 4 to 6 lightning flashes per square kilometer per year between 2010 and 2018. Therefore, the probability of future events are highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the region.

5.7 SEVERE WINTER WEATHER

5.7.1 Background and Description

Severe winter weather can range from a moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damages, such as roof collapses on older buildings.

All severe winter weather events have the potential to present dangerous conditions to the affected area. Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. A heavy snow event is defined by the National Weather Service as an accumulation of 4 of more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least three hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice storms are defined as storms with significant amounts of freezing rain and are a result of cold air damming (CAD). CAD is a shallow, surface-based layer of relatively cold, stably-stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super-cooled (liquid below the melting point of water) or re-freezes. In the former case, super-cooled droplets can freeze on impact (freezing rain), while in the latter case, the re-frozen water particles are ice pellets (or sleet). Sleet is defined as partially frozen raindrops or refrozen snowflakes that form into small ice pellets before reaching the ground. They typically bounce when they hit the ground and do not stick to the surface. However, it does accumulate like snow, posing similar problems and has the potential to accumulate into a layer of ice on surfaces. Freezing rain, conversely, usually sticks to the ground, creating a sheet of ice on the roadways and other surfaces. All of the winter storm elements – snow, low temperatures, sleet, ice, and etcetera - have the potential to cause significant hazard to a community. Even small accumulations can down power lines and trees limbs and create hazardous driving conditions. Further, communication and power may be disrupted for days.

5.7.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Southeastern NC Region is vulnerable to severe winter weather conditions, although occurrences are less frequent than in other part of the State. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

5.7.3 Historical Occurrences

The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest one-day snowfall recorded in the Southeastern NC Region was in December 1989, which resulted in approximately 17.5 inches of snowfall in New Hanover County.

According to the National Centers for Environmental Information, there have been a total of 31 recorded winter storm events in the Southeastern NC Region since 1996 (**Table 5.19**).[13] The property damage amounts associated with these events are obviously under reported but are the best available data at this time. The results will be updated in the future should better data become available.

TABLE 5.19: SUMMARY OF SEVERE WINTER WEATHER EVENTS

Location	Number of Occurrences	Deaths/Injuries	Property Damage
Brunswick County	5	0/0	$0
New Hanover County	6	0/0	$0
Onslow County	14	0/35	$145,000
Pender County	6	1/0	$0
TOTAL	**31**	**1/35**	**$145,000**

Source: National Centers for Environmental Information

5.7.4 Probability of Future Occurrences

The Southeastern NC Region is unlikely to be hit with severe blizzard conditions (i.e., high winds and blowing snow), but it is subject to freezing rain, icing, and snowfall. Based on historic information and the geographic location of the Southeastern NC area, winter storms events will remain a "possible" (between 1% and 10% annual probability) occurrence in the Southeastern NC Region.

[13] These ice and winter storm events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is likely that additional winter storm conditions have affected the Southeastern NC Region. In addition, the 31 events are reported by county, so many of these storms likely affected all of the counties and their respective municipalities.

5.8 EARTHQUAKES

5.8.1 Background and Description

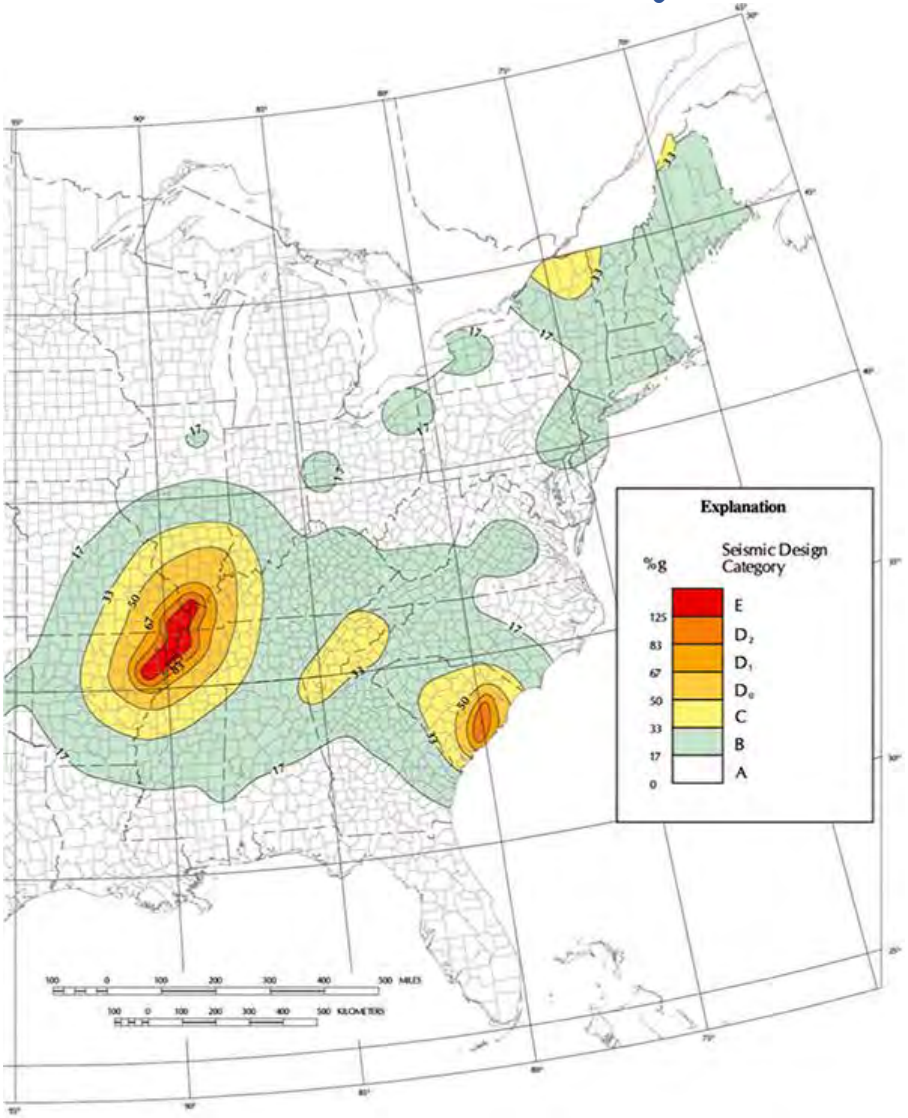
An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength, a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United State does face moderate risk to less frequent, less intense earthquake events. **Figure 5.9** shows relative seismic risk for the United States.

FIGURE 5.9: EASTERN UNITED STATES EARTHQUAKE HAZARD MAP



Source: Federal Emergency Management Agency

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 5.20**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from "I" corresponding to imperceptible (instrumental) events to "XII" for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 5.21**.

TABLE 5.20: RICHTER SCALE

Richter Magnitudes	Earthquake Effects
< 3.5	Generally not felt, but recorded.
3.5 – 5.3	Often felt, but rarely causes damage.
5.4 – 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 – 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 – 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: Federal Emergency Management Agency

TABLE 5.21: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

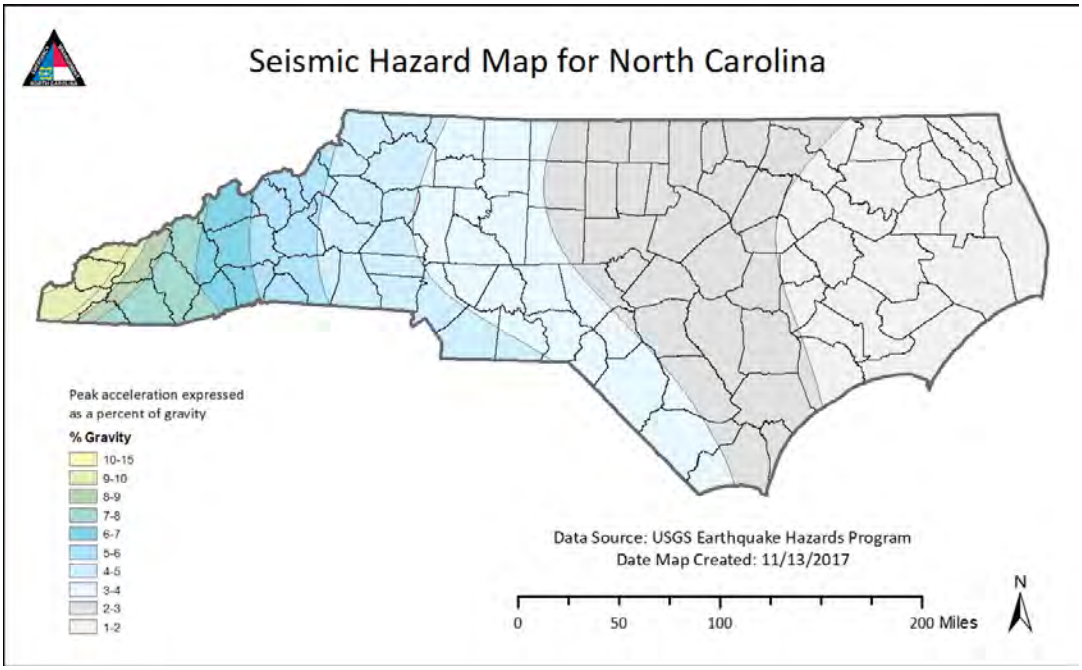
Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Not felt	Not felt except by a very few under especially favorable conditions.	
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.	< 4.2
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.	
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.	< 4.8
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	< 5.4
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.	< 6.1
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.	
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.	< 6.9
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	< 7.3

Source: Federal Emergency Management Agency

5.8.2 Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure 5.10** is a map showing geological and seismic information for North Carolina.

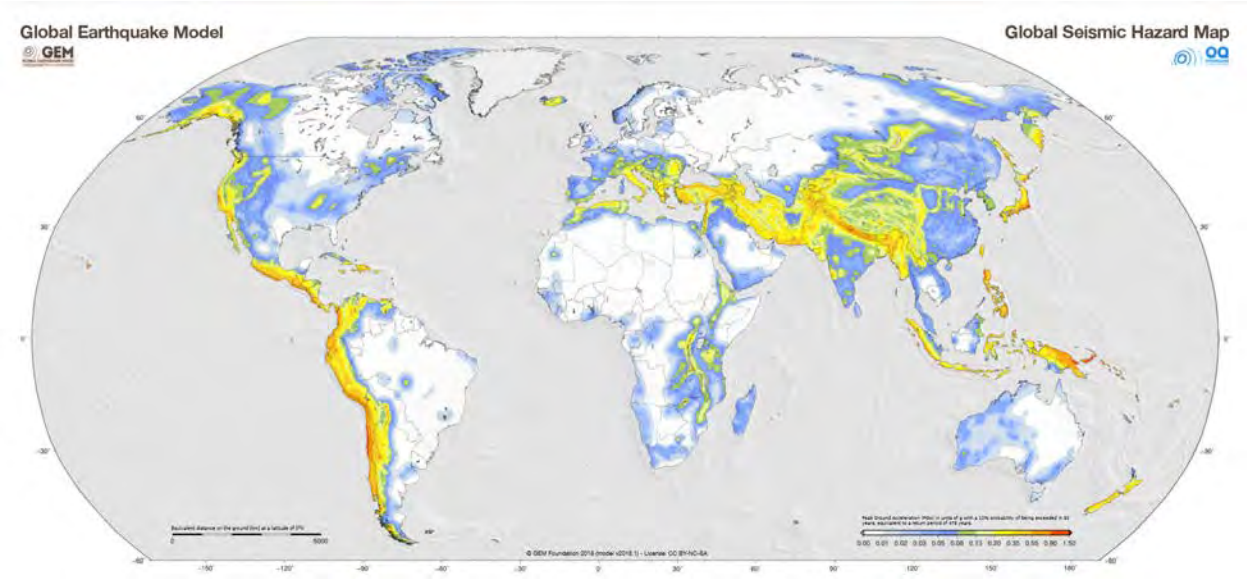
FIGURE 5.10: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



Source: North Carolina Geological Survey

Figure 5.11 shows the intensity level associated with the Southeastern NC Region, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, the Southeastern NC Region is split between three zones ranging from level "1" to "4" ground acceleration. This indicates that the region as a whole exists within an area of low to moderate seismic risk.

FIGURE 5.11: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Source: Global Earthquake Model, 2018

5.8.3 Historical Occurrences

At least 26 earthquakes are known to have affected the Southeastern NC Region since (1886). The strongest of these measured a V on the Modified Mercalli Intensity (MMI) scale. **Table 5.22** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985.

TABLE 5.22: SUMMARY OF SEISMIC ACTIVITY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Brunswick County	**10**	**IV**	**< 4.8**
Bald Head Island	0	--	--
Belville	0	--	--
Boiling Spring Lakes	0	--	--
Bolivia	0	--	--
Calabash	0	--	--
Carolina Shores	0	--	--
Holden Beach	0	--	--
Leland	0	--	--
Navassa	0	--	--
Northwest	0	--	--
Oak Island	0	--	--
Ocean Isle Beach	0	--	--
Sandy Creek	0	--	--
Shallotte	3	III	< 4.2
Southport	7	IV	< 4.8
St. James	0	--	--

	Sunset Beach	0	--	--
	Varnamtown	0	--	--
	Unincorporated Area	0	--	--
New Hanover County		**13**	**V**	**< 4.8**
	Carolina Beach	6	IV	< 4.8
	Kure Beach	3	V	< 4.8
	Wilmington	0	--	--
	Wrightsville	4	IV	< 4.8
	Unincorporated Area	0	--	--
Onslow County		**1**	**V**	**< 4.8**
	Holly Ridge	0	--	--
	Jacksonville	0	--	--
	North Topsail Beach	0	--	--
	Richlands	1	V	< 4.8
	Swansboro	0	--	--
	Unincorporated Area	0	--	--
Pender County		**2**	**IV**	**< 4.8**
	Atkinson	0	--	--
	Burgaw	1	III	< 4.2
	St. Helena	0	--	--
	Surf City	1	IV	< 4.8
	Topsail Beach	0	--	--
	Watha	0	--	--
	Unincorporated Area	0	--	--
Southeastern NC REGION TOTAL		**26**	**V**	**< 4.8**

Source: National Geophysical Data Center

Note: No further details about these events could be located. Future updates of the plan will attempt to provide more context to previously reported earthquake events.

In addition to those earthquakes specifically affecting the Southeastern NC Region, a list of earthquakes that have caused damage throughout North Carolina is presented below in **Table 5.23**.

TABLE 5.23: EARTHQUAKES WHICH HAVE CAUSED DAMAGE IN NORTH CAROLINA

Date	Location	Richter Scale (Magnitude)	MMI (Intensity)	MMI in North Carolina
12/16/1811 - 1	NE Arkansas	8.5	XI	VI
12/16/1811 - 2	NE Arkansas	8.0	X	VI
12/18/1811 - 3	NE Arkansas	8.0	X	VI
01/23/1812	New Madrid, MO	8.4	XI	VI
02/071812	New Madrid, MO	8.7	XII	VI
04/29/1852	Wytheville, VA	5.0	VI	VI
08/31/1861	Wilkesboro, NC	5.1	VII	VII
12/23/1875	Central Virginia	5.0	VII	VI
08/31/1886	Charleston, SC	7.3	X	VII
05/31/1897	Giles County, VA	5.8	VIII	VI
01/01/1913	Union County, SC	4.8	VII	VI

02/21/1916	Asheville, NC	5.5	VII	VII
07/08/1926*	Mitchell County, NC	5.2	VII	VII
11/03/1928	Newport, TN	4.5	VI	VI
05/13/1957	McDowell County, NC	4.1	VI	VI
07/02/1957	Buncombe County, NC	3.7	VI	VI
11/24/1957	Jackson County, NC	4.0	VI	VI
10/27/1959 **	Chesterfield, SC	4.0	VI	VI
07/13/1971	Newry, SC	3.8	VI	VI
11/30/1973	Alcoa, TN	4.6	VI	VI
11/13/1976	Southwest Virginia	4.1	VI	VI
05/05/1981	Henderson County, NC	3.5	VI	VI
2020	Sparta, NC			

**This event is accounted for in the Southeastern NC occurrences.*
*** Conflicting reports on this event, intensity in North Carolina could have been either V or VI*
Source: This information compiled by Dr. Kenneth B. Taylor and provided by Tiawana Ramsey of NCEM. Information was compiled from the National Earthquake Center, Earthquakes of the US by Carl von Hake (1983), and a compilation of newspaper reports in the Eastern Tennessee Seismic Zone compiled by Arch Johnston, CERI, Memphis State University (1983).

5.8.4 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Southeastern NC Region is unlikely. However, it is likely that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the region. The annual probability level for the region is estimated between 1 and 10 percent (possible).

5.9 GEOLOGICAL HAZARDS

5.9.1 Background and Description

For the purposes of maintaining consistency with the State of North Carolina Hazard Mitigation Plan, this section will assess geological hazards which include sinkholes, and coastal erosion.

Sinkholes

According to the United States Geological Survey, a sinkhole is an area of ground that has no natural external surface drainage--when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface. Sinkholes can vary from a few feet to hundreds of acres and from less than 1 to more than 100 feet deep. Some are shaped like shallow bowls or saucers whereas others have vertical walls.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. These collapses can be small, or, as **Figure 5.12** below shows, they can be huge and can occur where a house or road is on top[14].

FIGURE 5.12: SINKHOLE IN NORTH CAROLINA

Source: NCEM

Coastal Erosion

Coastal or beach erosion is the wearing away of the beach and dune sediments due to winds, tidal currents, or wave action. Erosion is typically event-driven and tends to happen during periods of strong winds, high tides and waves, such as a storm; however, continued erosion wears away the coastal profile and can create imbalance on shorelines. An eroding beach may lose feet of sand per year.

[14] *Sinkholes. United States Geological Survey. Retrieved on December 14, 2017 from: https://water.usgs.gov/edu/sinkholes.html*

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils. Major storms, such hurricanes in coastal areas, may cause significant erosion by combining high winds with heavy surf and storm surge to significantly impact the shoreline.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand is most susceptible to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion. Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

During the past 20 years, the importance of erosion control has gained the increased attention of the public. Erosion clearly affects the environment, but it also is problematic for homes and businesses that are constructed on or near beaches. Severe erosion can cause extreme property loss or damages. Many beaches rely on sandbags to be placed in front of homes and dunes to protect them from falling into the ocean.

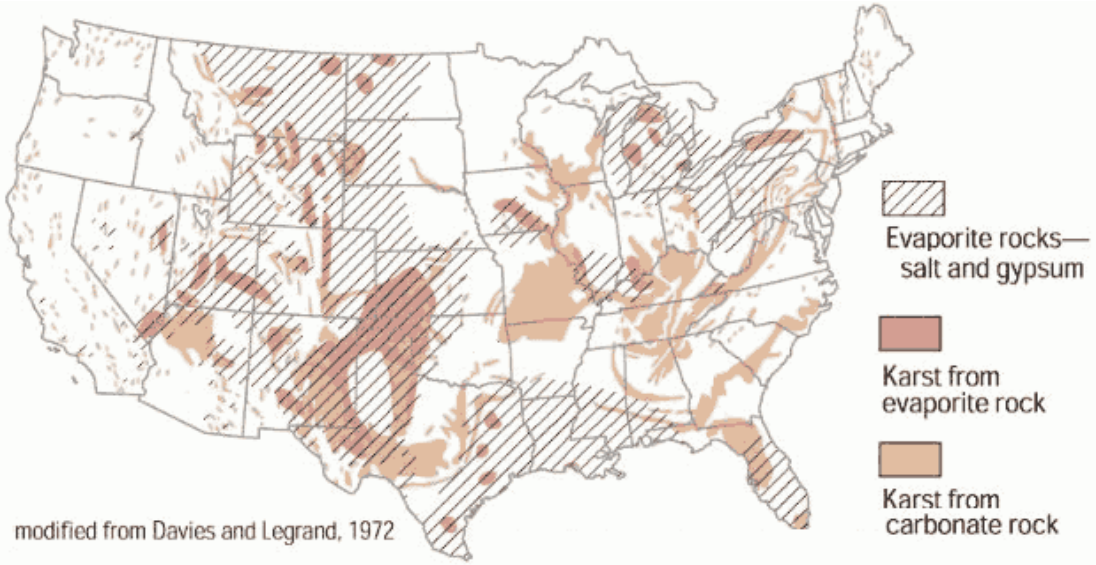
5.9.2 Location and Spatial Extent

Sinkholes

Figure 5.13 below shows areas of the United States where certain rock types that are susceptible to dissolution in water occur. In these areas, the formation of underground cavities can form and catastrophic sinkholes can happen. These rock types are evaporites (salt, gypsum, and anhydrite) and carbonates (limestone and dolomite). Evaporite rocks underlie about 35 to 40 percent of the United States, though in many areas they are buried at great depths. In some cases, sinkholes in North Carolina have been measured at up to 20 to 25 feet in depth, with similar widths.

At the time of this update, GIS data for sinkholes was not readily available. Therefore, mapping sinkhole areas at the county and/or municipal levels was not feasible. Future updates of this plan will attempt to provide better mapping for the sinkhole hazard.

FIGURE 5.13: UNITED STATES GEOLOGICAL SURVEY OF KARST MODIFIED FROM DAVIES AND LEGRAND, 1972



Coastal Erosion

In North Carolina, the NC Division of Coastal Management and the NC Geological Survey study calculated shoreline change rates. These can vary throughout the state in different locations, but it is notable that, on average, the state is experiencing 1.6 feet per year of erosion based on a study at multiple locations by the NC Department of Environmental Quality. Figures 5.14 through 5.17 show areas where coastline is eroding and accreting according to state data.

5.9.3 Historical Occurrences

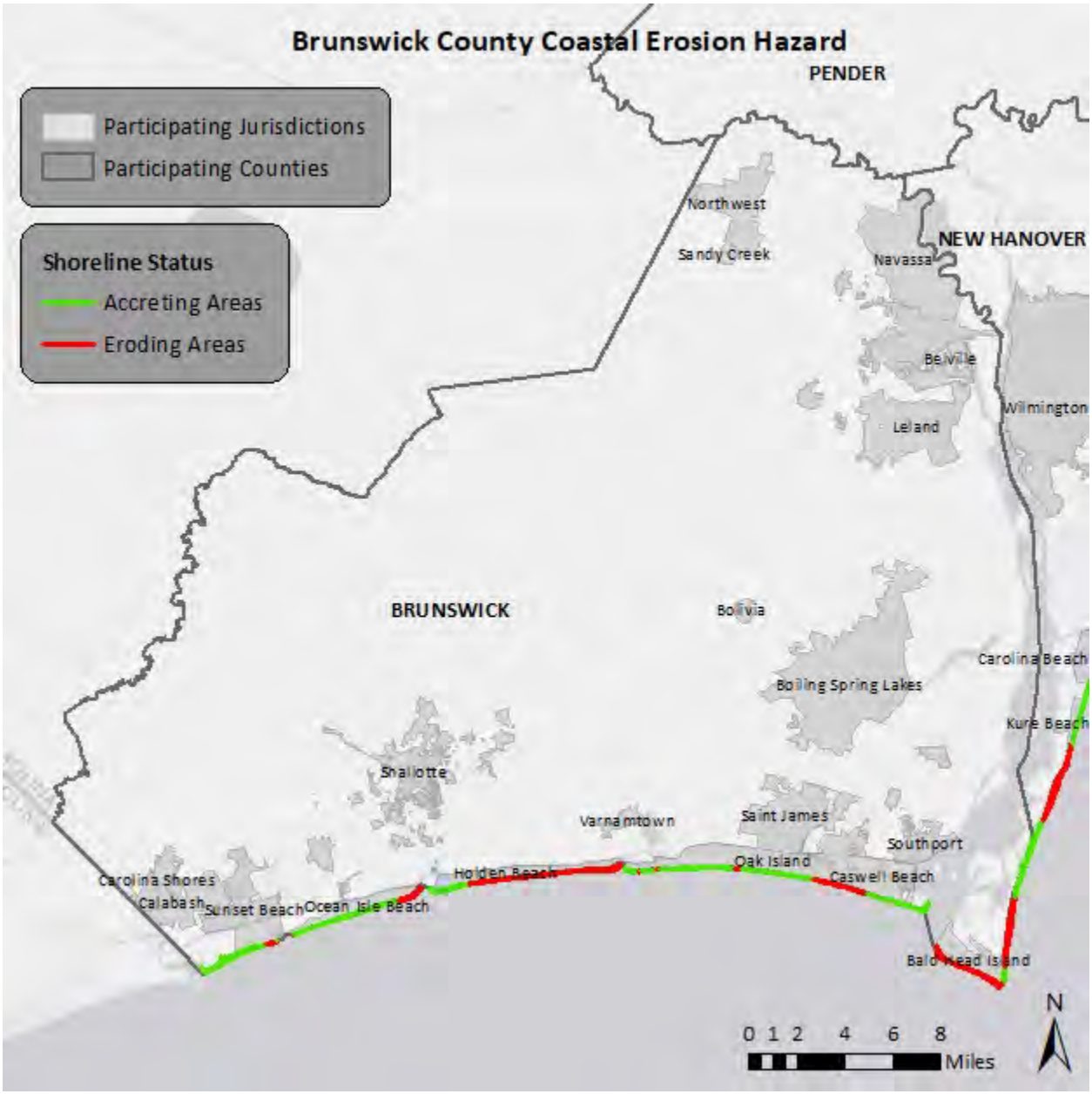
Sinkholes

According the North Carolina Division of Environmental Quality, sinkholes have occurred across the entire Southeastern NC Region. Notable examples occurred near Snow's Cut and Carolina Beach State Park (New Hanover County), along Interstate 40 (Pender County), Sunny Point Military Ocean Terminal, and Boiling Spring Lakes (Brunswick County) where sinkholes caused the lakes to drain in the mid-90's.

Coastal Erosion

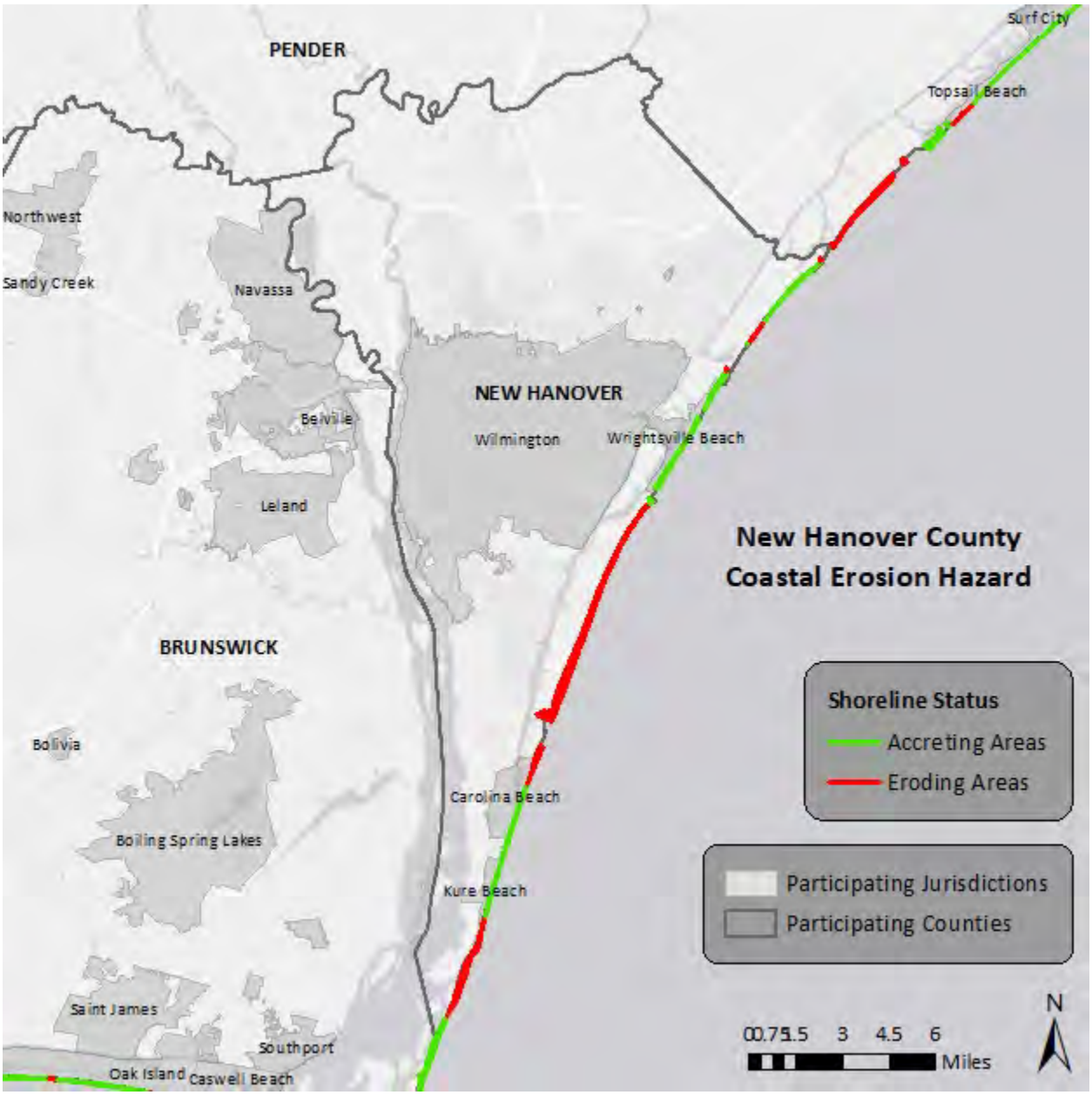
Erosion in the Southeastern NC Region has occurred primarily along the beaches directly adjacent to the Atlantic Ocean. **Figures 5.14 through 5.17** illustrate historic shoreline data for areas that have experienced accreting or eroding shorelines as of 2011. These are point values which are monitored by the North Carolina Department of Environmental Quality.

FIGURE 5.14: COASTAL EROSION RATES IN BRUNSWICK COUNTY



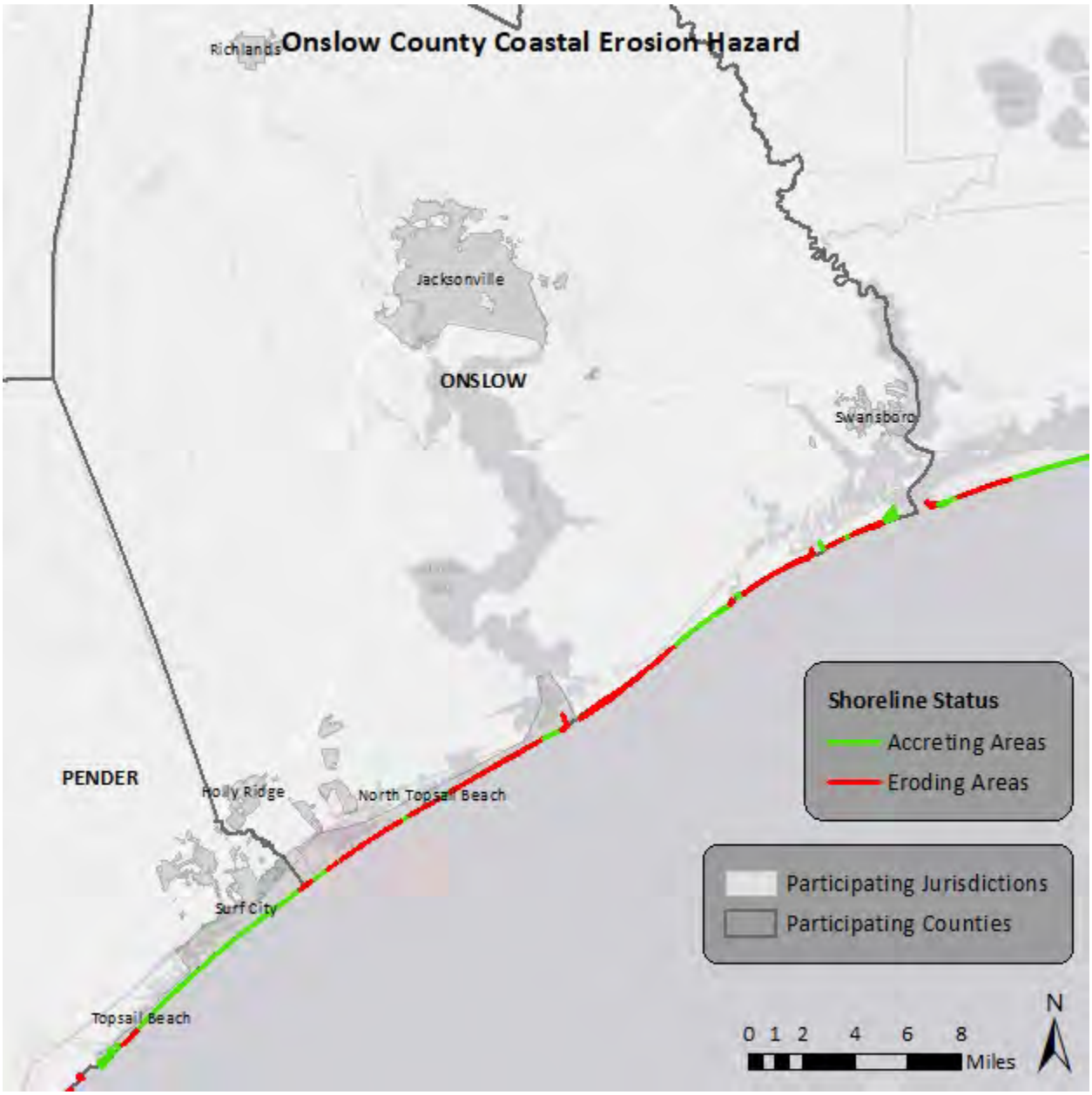
Source: NCDEQ

FIGURE 5.15: COASTAL EROSION RATES IN NEW HANOVER COUNTY



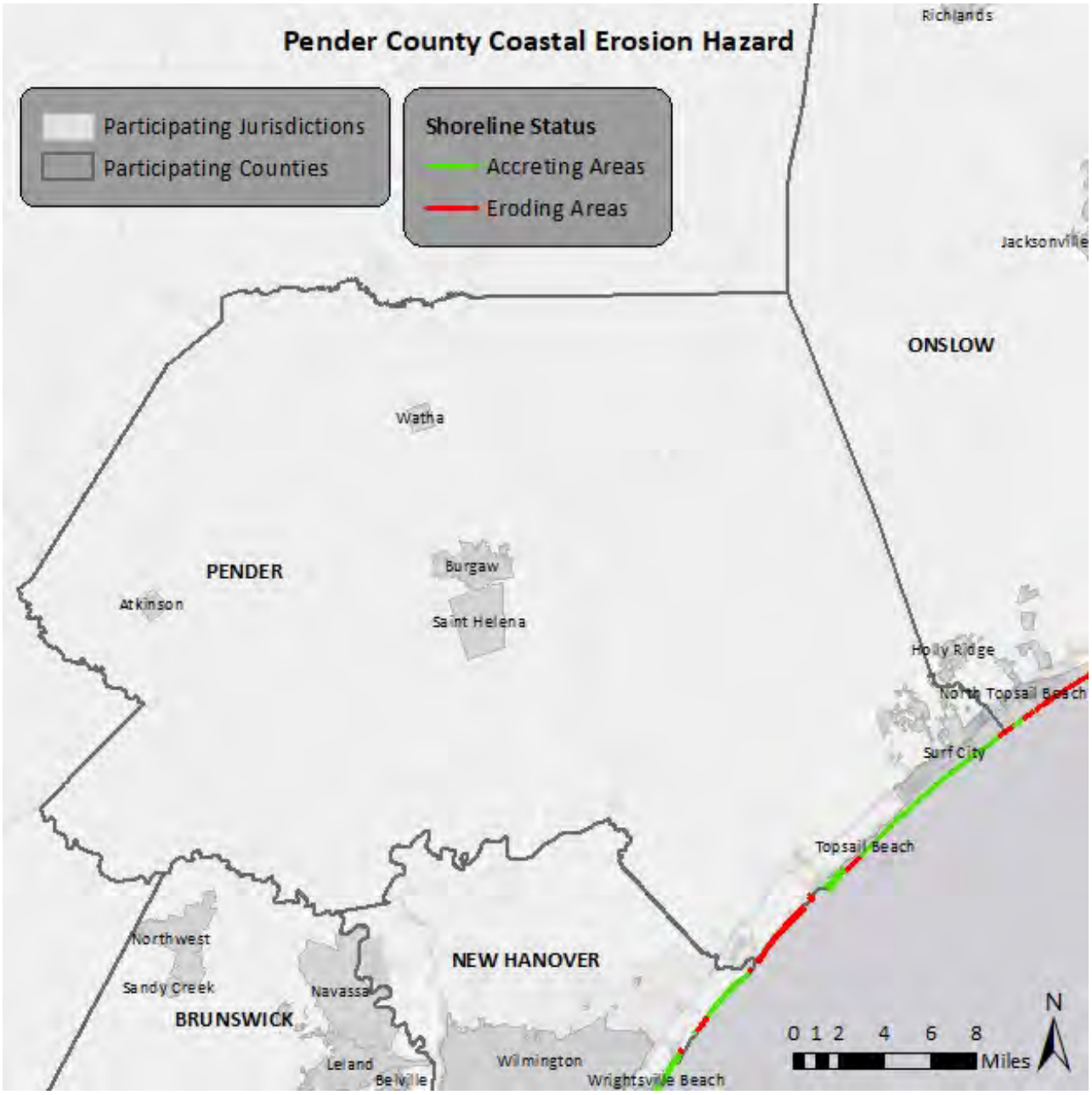
Source: NCDEQ

FIGURE 5.16: COASTAL EROSION RATES IN ONSLOW COUNTY



Source: NCDEQ

FIGURE 5.17: COASTAL EROSION RATES IN PENDER COUNTY



Source: NCDEQ

5.9.4 Probability of Future Occurrences

Sinkhole

Based on historical information and the NCDEQ, the probability of future sinkhole events is likely (between 10 and 100 percent annual probability). The coastal population is growing, as is the region's need for water. As more water gets pumped out of the ground for public and private use, the water level in the limestone cavities will drop. When the water is no longer in the cavity to help support the ceiling, the cavity will be more likely to collapse, forming a sinkhole.

Coastal Erosion

Coastal erosion remains a natural, dynamic and continuous process for the coastal areas in the Southeastern NC Region, and its probability of future occurrence is highly likely (100 percent annual probability). The damaging impacts of coastal erosion are lessened through continuous (and costly) beach nourishment and structural shoreline protection measures; however, it is likely that the impacts of coastal erosion will increase in severity due to future episodic storms.

5.10 DAM FAILURES

5.10.1 Background and Description

Worldwide interest in dam safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation and maintenance.

There are approximately 80,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

Though dams have many benefits, they also can pose a risk to communities if not designed, operated, and maintained properly. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if development exists downstream. If a levee breaks, scores of properties may become submerged in floodwaters and residents may become trapped by rapidly rising water. The failure of dams has the potential to place large numbers of people and great amounts of property in harm's way.

5.10.2 Location and Spatial Extent

The North Carolina Division of Energy, Mineral, and Land Resources provides information on dams including a hazard potential classification. There are three hazard classifications- high, intermediate, and low- that correspond to qualitative descriptions and quantitative guidelines. **Table 5.24** explains these classifications.

TABLE 5.24: NORTH CAROLINA DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than $30,000
Intermediate	Damage to highways, Interruption of service	25 to less than 250 vehicles per day
	Economic damage	$30,000 to less than $200,000
High	Loss of human life*	Probable loss of 1 or more human lives
	Economic damage	More than $200,000
	*Probable loss of human life due to breached roadway or bridge on or below the dam.	250 or more vehicles per day

Source: North Carolina Division of Land Resources

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are twenty-nine (29) dams in the Southeastern NC Region[15]. **Figure 5.18** shows the dam location and the corresponding

[15] *The October 1, 2018 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land*

hazard ranking for each. Of these dams, nine (9) are classified as high hazard potential. These high hazard dams are listed in **Table 5.25**.

FIGURE 5.18: DAM LOCATIONS AND HAZARD POTENTIAL

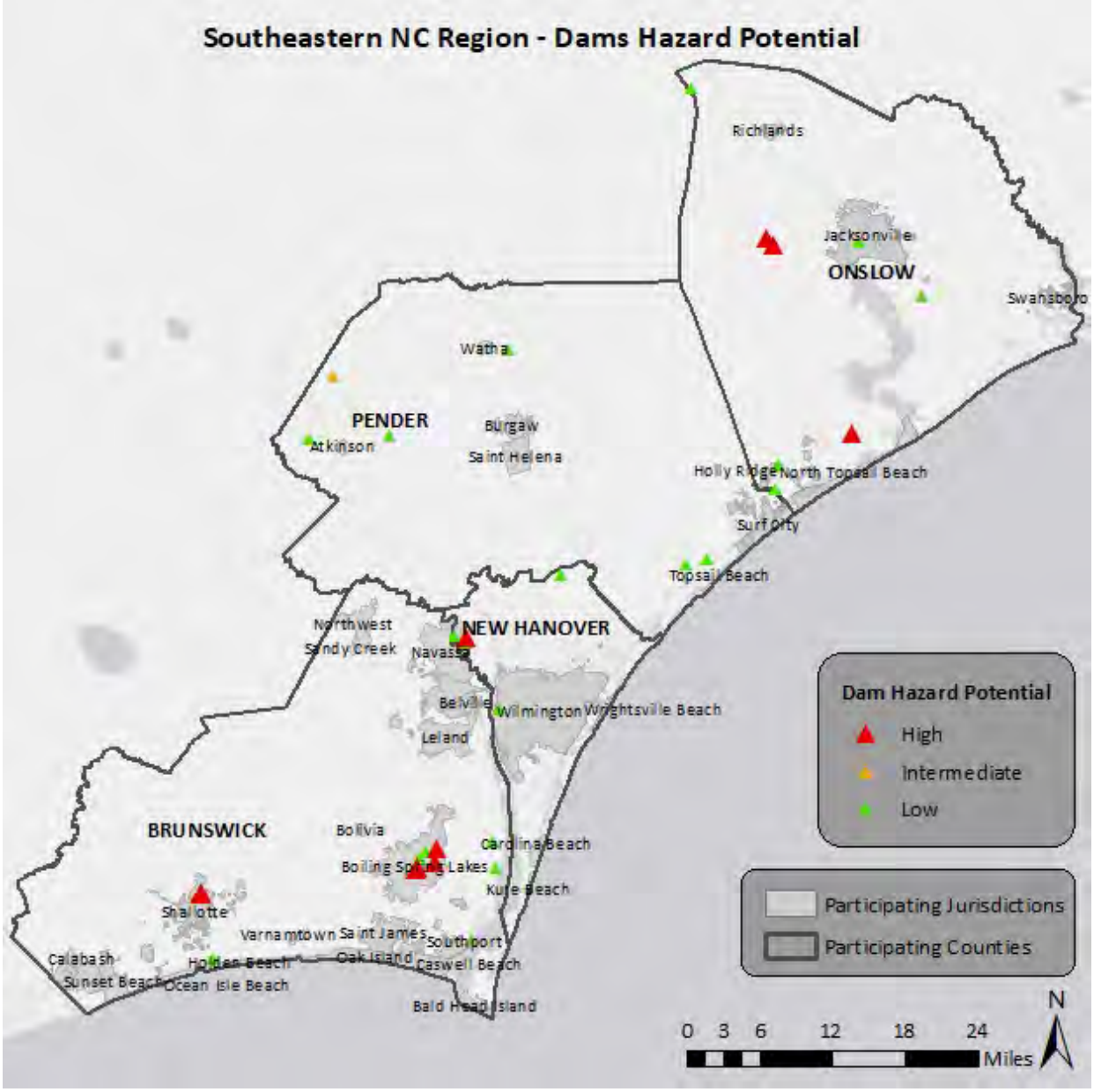


TABLE 5.25: SOUTHEASTERN NC REGION HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (Acres)	Max Capacity (Ac-ft)	State Regulated?
Brunswick County				
Boiling Springs Lake Dam	High	200	3600	**Yes**
Shallotte Wastewater Lagoon No.1	High	5	100	**Yes**

Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Dam Name	Hazard Potential	Surface Area (Acres)	Max Capacity (Ac-ft)	State Regulated?
Shallotte Wastewater Lagoon No.2	High	12	240	**Yes**
Boiling Springs Lake Upper Dam	High	80	300	**Yes**
New Hanover County				
Sutton 1971 Ash Pond	High	102.5	284	**Yes**
Sutton 1984 Ash Pond	High	27.5	1364	**Yes**
Onslow				
Jacksonville Waste Water Lagoon	High	500	15	**Yes**
North Topsail Water & Sewer Lagoon	High	10	180	**Yes**
Jacksonville LTS-South Storage Lagoon	High	0	0	**Yes**

Source: North Carolina Division of Land Resources

5.10.3 Historical Occurrences

The information below identified additional historical information reported in the previous hazard mitigation plans.

Brunswick County

While the City of Boiling Spring Lakes was in the process of submitting plans to create an emergency spillway for the Sanford Dam in Boiling Spring Lakes, Hurricane Florence impacted the region and the Sanford Dam and three other dams (Upper Lake, Pine Lake and North Lake) were breached.

New Hanover County

The National Centers for Environmental Information reported the one dam failure at the Duke Power plant at Sutton Lake (New Hanover County) on September 21, 2018. An earthen dam at Sutton Lake breached, with water from the Cape Fear River tipping into an on-site basin used to store coal ash. The flooding was not severe and did not cause any damages to roads or buildings.

Onslow County

There have been no dam breaches in Onslow County.

Pender County

No information on past dam failure events were provided.

5.10.4 Probability of Future Occurrences

Given that most high hazard dams are routinely inspected and monitored, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

Inventories of statewide dam inundation data is an area that NCEM-RM is currently working hard to improve. At this time, there is geospatial data in final quality control review for 19 dams in North Carolina and that number is expected to increase significantly over the next several years. Additionally, NCEM is currently working with the United States Army Corps of Engineers (USACE) to acquire inundation data for 9 dams under the Corps' management. As this data becomes available, detailed assessments can be run to better determine vulnerability to dam failures. The 2026 update of this plan may include a much more robust analysis of dam failure vulnerability at the County level.

5.11 FLOODING

5.11.1 Background

Flooding is the most frequent and costly natural hazard in the United States; a hazard that has caused more than 10,000 deaths since 1900. Nearly 90 percent of presidential disaster declarations result from natural events where flooding was a major component.

Floods generally result from excessive precipitation, and can be classified under two categories: general floods, precipitation over a given river basin for a long period of time along with storm-induced wave action; and flash floods, the product of heavy localized precipitation in a short time period over a given location. The severity of flooding event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface.

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding, which is a concern for the Southeastern NC Region, is typically a result of storm surge, wind-driven waves and heavy rainfall produced by hurricanes, tropical storms and other large coastal storms. Urban flooding occurs where manmade development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by a retention basin or other stormwater control facility. Although flash flooding occurs most often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

The periodic flooding of lands adjacent to rivers, streams and shorelines (land known as floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplain boundaries are designated and routinely updated through Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) reports and these revisions are then shown on Flood Insurance Rate Maps (FIRMs), according to various flood hazard zones. Flood hazard zone designations will depend upon local conditions and the date when the map was issued, but all will show the 100-year or base floodplain (1-percent annual chance), as well as areas of the 500-year floodplain (0.2-percent annual chance).

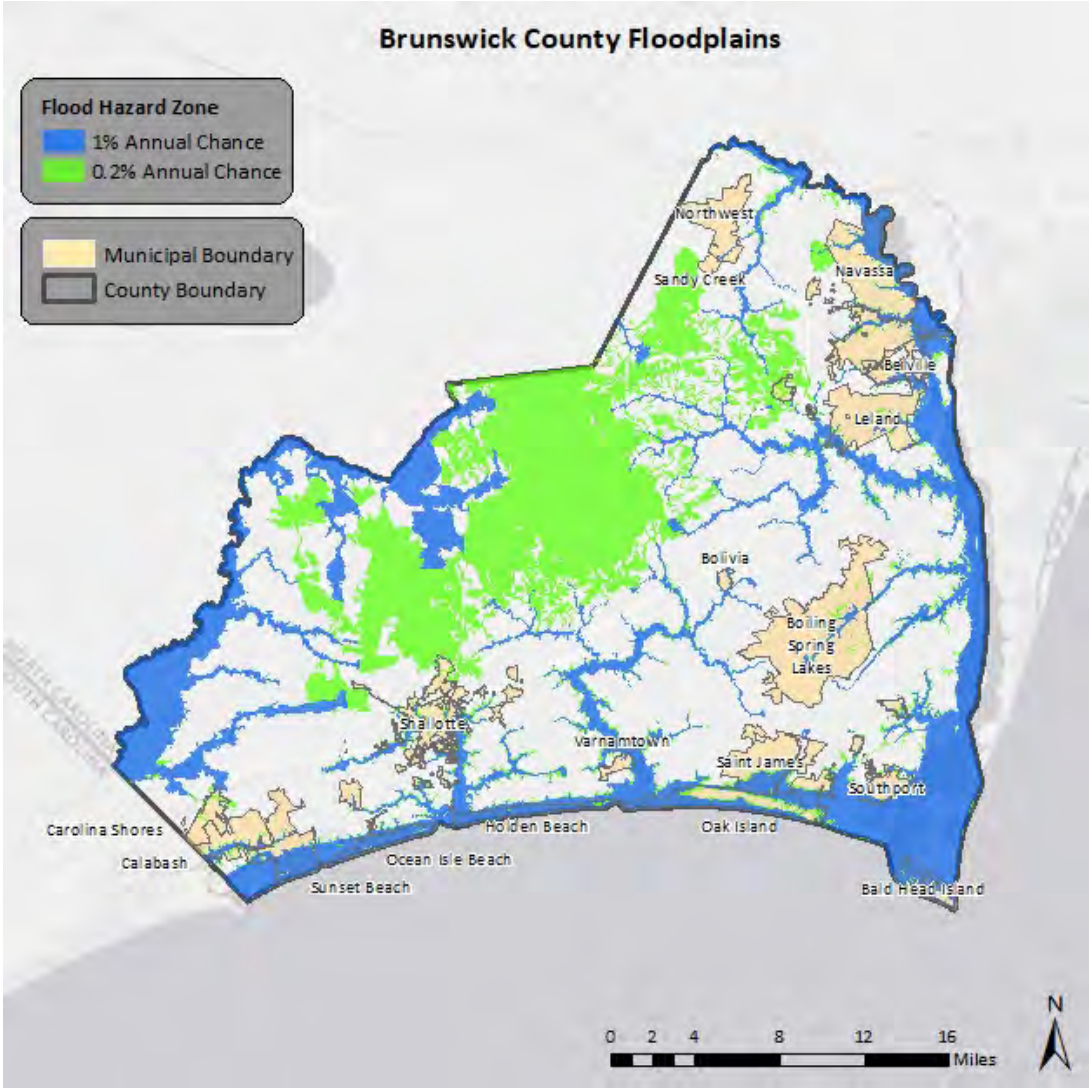
5.11.2 Location and Spatial Extent

There are areas in the Southeastern NC Region that are susceptible to flooding. Special flood hazard areas in the Southeastern NC Region were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1 percent annual chance

floodplain), Zone AE (1-percent annual chance floodplain with elevation), Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 3,217 square miles that make up the Southeastern NC Region (including the area of Brunswick County, New Hanover County, Onslow County, and Pender County), there are 0.325 square miles of land in zone A (1-percent annual chance floodplain), 37.815 square miles of land in zone AE (1-percent annual chance with elevation), and 2.506 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain). These flood zone values account for 0.03 percent of the total land area in the Southeastern NC Region. It is important to note that while FEMA digital data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas.

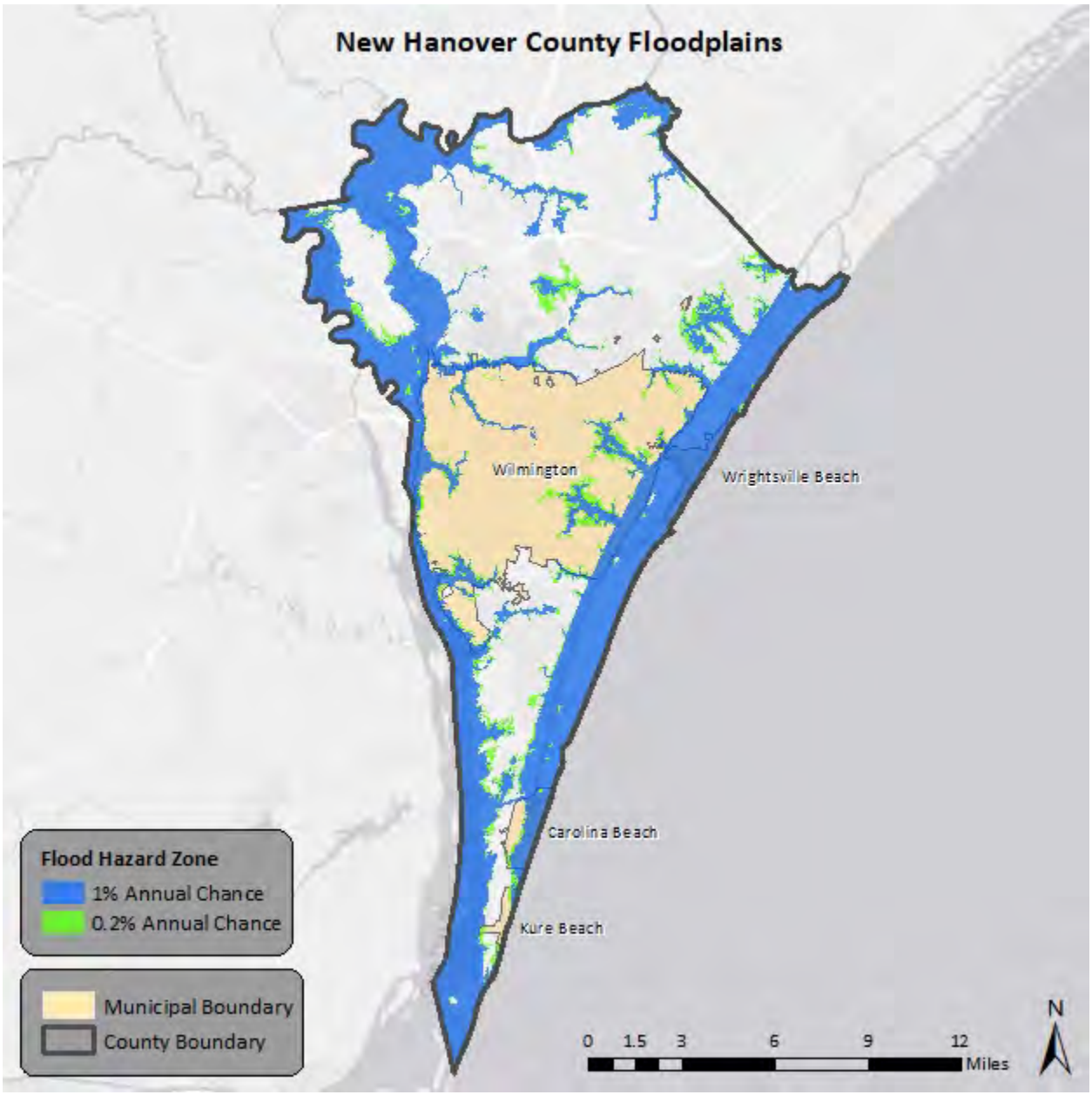
Figure 5.19-5.22 illustrates the location and extent of currently mapped special flood hazard areas for each county of the Southeastern NC Region based on best available FEMA Digital Flood Insurance Rate (DFRIM) data.

FIGURE 5.19: SPECIAL FLOOD HAZARD AREAS IN BRUNSWICK COUNTY



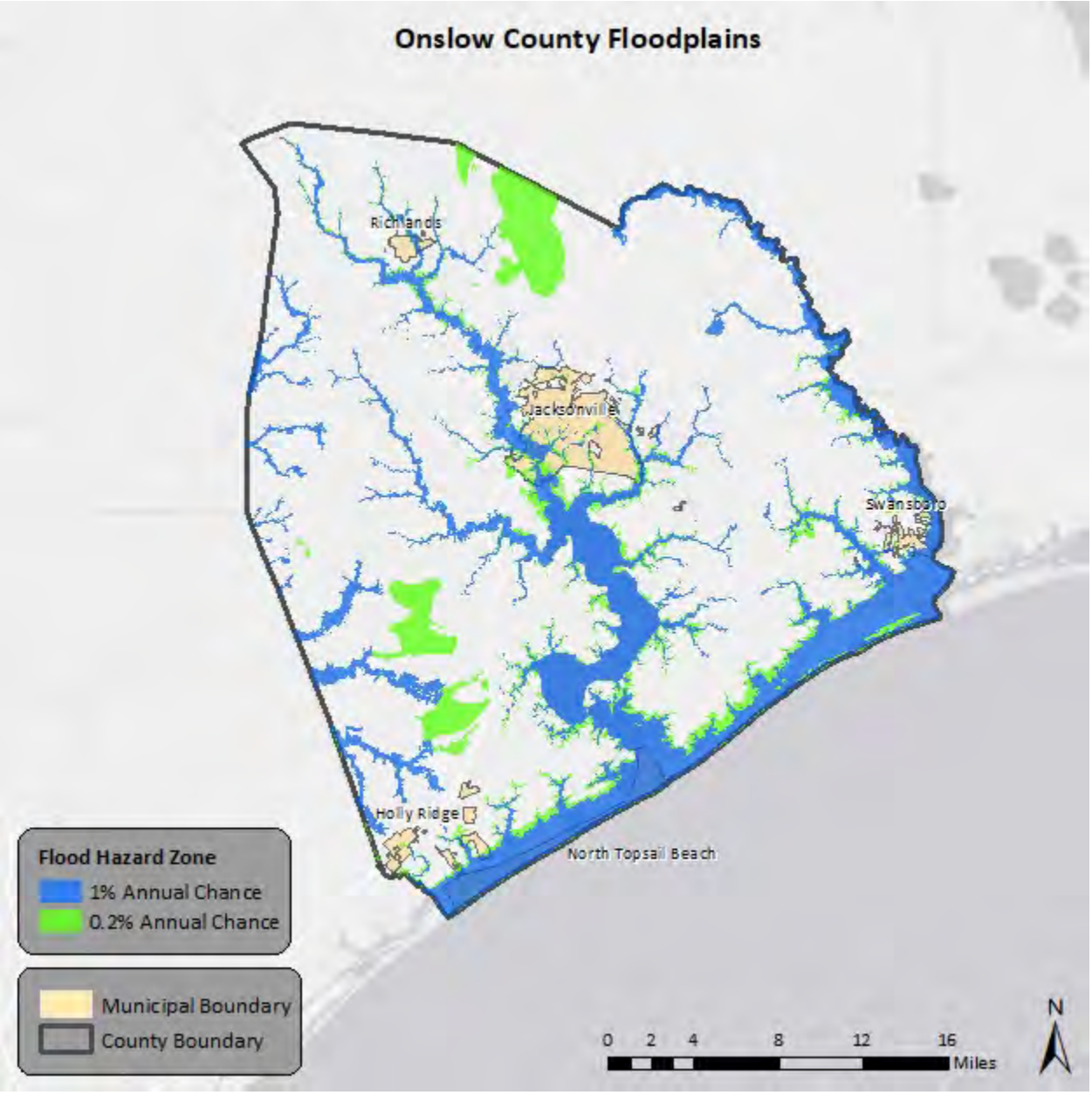
Source: Federal Emergency Management Agency

FIGURE 5.20: SPECIAL FLOOD HAZARD AREAS IN NEW HANOVER COUNTY



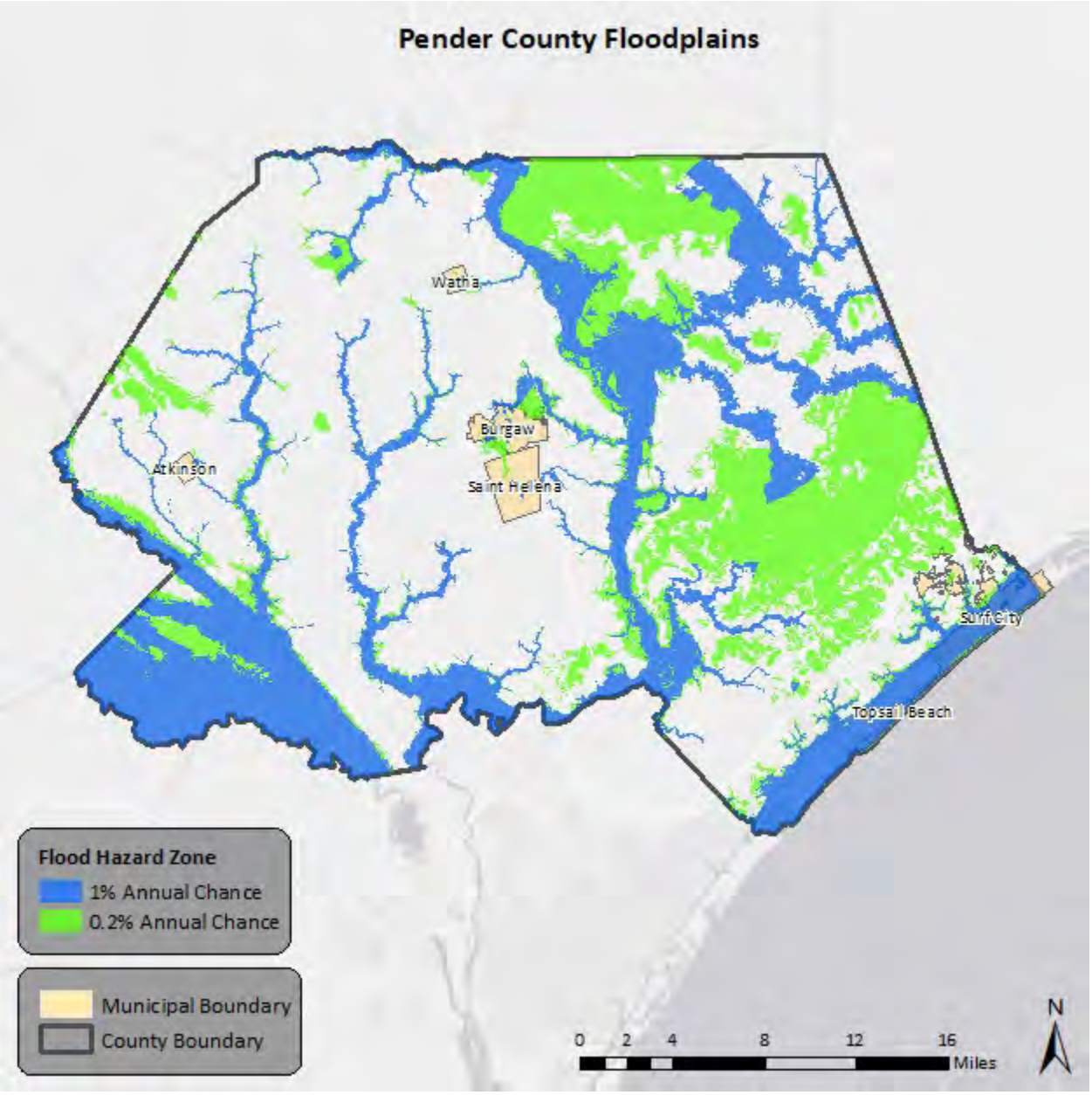
Source: Federal Emergency Management Agency

FIGURE 5.21: SPECIAL FLOOD HAZARD AREAS IN ONSLOW COUNTY



Source: Federal Emergency Management Agency

FIGURE 5.22: SPECIAL FLOOD HAZARD AREAS IN PENDER COUNTY



Source: Federal Emergency Management Agency

5.11.3 Historical Occurrences

Information from the National Center for Environmental Information was used to ascertain historical flood events. The National Centers for Environmental Information reported a total of three hundred and fifty (350) events throughout the Southeastern NC Region since June 1997.[16] A list of these events is presented in **Table 5.26**. These events accounted for over $28.6 million in property damage due to flood

[16] These events are only inclusive of those reported by NCEI. It is likely that additional occurrences have occurred and have gone unreported.

events throughout the region.[17] Specific information on flood events for each county including date, type of flooding, and deaths and injuries, can be found in **Appendix H**.

TABLE 5.26: SUMMARY OF FLOOD OCCURRENCES IN THE SOUTHEASTERN NC REGION

Area	Number of Occurrences	Deaths	Injuries	Property Damage (2019)	Crop Damage
Brunswick County	**83**	**0**	**0**	**$5,783,000.00**	**$0**
Bald Head Island	0	0	0	$0	$0
Belville	0	0	0	$0	$0
Boiling Spring Lakes	0	0	0	$0	$0
Bolivia	3	0	0	$0	$0
Calabash	7	0	0	$300,000	$0
Carolina Shores	0	0	0	$0	$0
Holden Beach	1	0	0	$0	$0
Leland	7	0	0	$150,000	$0
Navassa	1	0	0	$1,000,000	$0
Northwest	0	0	0	$0	$0
Oak Island	0	0	0	$0	$0
Ocean Isle Beach	0	0	0	$0	$0
Sandy Creek	0	0	0	$0	$0
Shallotte	6	0	0	$10,000	$0
Southport	2	0	0	$0	$0
St. James	0	0	0	$0	$0
Sunset Beach	0	0	0	$0	$0
Varnamtown	0	0	0	$0	$0
Unincorporated Area	56	0	0	$4,323,000.00	$0
New Hanover County	**151**	**0**	**2**	**$6,124,000.00**	**$0.00**
Carolina Beach	11	0	0	$250,000	$0
Kure Beach	0	0	0	$0	$0
Wilmington	41	0	1	$451,000	$0
Wrightsville	1	0	0	$0	$0
Unincorporated Area	98	0	1	$5,423,000	$0
Onslow County	**36**	**0**	**0**	**$2,230,000.00**	**$6,000,000.00**
Holly Ridge	0	0	0	$0	$0
Jacksonville	4	0	0	$80,000	$0
North Topsail Beach	0	0	0	$0	$0
Richlands	0	0	0	$0	$0
Swansboro	1	0	0	$0	$0
Unincorporated Area	31	0	0	$2,150,000.00	$6,000,000
Pender County	**80**	**1**	**0**	**$6,425,000.00**	**$0.00**
Atkinson	0	0	0	$0	$0
Burgaw	16	0	0	$17,000	$0
St. Helena	0	0	0	$0	$0
Surf City	2	0	0	$50,000	$0
Topsail Beach	8	0	0	$30,000.00	$0

[17] The total damage amount was averaged over the number of affected counties when multiple counties were involved in the flood event.

Watha	1	0	0	$0	$0
Unincorporated Area	53	1	0	$6,328,000.00	$0
Southeastern NC REGION TOTAL	**350**	**1**	**2**	**$20,562,000.00**	**$6,000,000.00**

Source: National Centers for Environmental Information

5.11.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of August 2015, there have been more than 26,261 flood losses reported in the Southeastern NC through the National Flood Insurance Program (NFIP) since 1970, totaling over $397 million in claims payments. A summary of these figures for each Southeastern NC county is provided in **Table 5.27**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood losses in the Southeastern NC Region were either uninsured, denied claims payment, or not reported.

TABLE 5.27: SUMMARY OF INSURED FLOOD LOSSES

Location	Policies	Claims	Claims Payments
Brunswick County	**19,471**	**6,431**	**$54,097,215**
Bald Head Island	1,048	644	$5,653,281
Belville	66	8	$27,399
Boiling Spring Lakes	171	82	$2,105,008
Bolivia	7	0	$0
Calabash	97	5	$75,749
Carolina Shores	779	28	$1,118,098
Caswell Beach	638	183	$1,181,432
Holden Beach	1,851	2,140	$11,995,039
Leland	1,031	43	$3,043,686
Navassa	17	3	$66,632
Northwest	7	1	$4,179
Oak Island	3,476	428	$3,906,629
Ocean Isle Beach	2,608	1,679	$7,308,888
Sandy Creek	0	0	$0
Shallotte	202	26	$1,194,222
Southport	564	123	$1,930,443
St. James	1,189	60	$388,614
Sunset Beach	1,808	250	$476,810
Varnamtown	21	1	$5,149
Unincorporated Area	3,891	709	$13,615,957
New Hanover County	**17,221**	**10,507**	**$165,831,926**
Carolina Beach	3,510	2,773	$34,489,479
Kure Beach	971	548	$17,193,391
Wilmington	3,817	576	$9,424,103
Wrightsville Beach	2,621	3,535	$51,886,583
Unincorporated Area	6,302	3,075	$52,838,370
Onslow County	**4,810**	**3,952**	**$66,846,501**
Holly Ridge	42	3	$48,767
Jacksonville	887	262	$5,953,315
North Topsail Beach	1,217	1,503	$20,581,302
Richlands	41	11	$534,351,
Swansboro	217	213	$2,690,897
Unincorporated Area	2,406	2,050	$50,000
Pender County	**5,104**	**5,371**	**$110,461,538**

Location	Policies	Claims	Claims Payments
Atkinson	2	0	$0
Burgaw	89	41	$1,980,521
St. Helena	4	0	$0
Surf City	1,775	1,739	$14,811,148
Topsail Beach	948	2,183	$23,213,045
Watha	2	0	$0
Unincorporated Area	2,284	1,408	$70,456,824
Southeastern NC REGION TOTAL	**46,606**	**26,261**	**$397,237,180**

Source: National Flood Insurance Program

5.11.5 Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 122,000 repetitive loss properties nationwide.

Table 5.28 provides summary information about the repetitive loss properties in the Southeastern NC region. Currently, there are 1,045 non-mitigated repetitive loss properties located in the Southeastern NC Region. Most of these properties are single family residential and the remaining are commercial or government-owned buildings. Without mitigation, these properties will likely continue to experience flood losses in the future.

TABLE 5.28: SUMMARY OF REPETITIVE LOSS PROPERTIES

Location	Number of Properties	Non Residential Properties	Residential Properties
Brunswick County	**667**	**8**	**659**
Boiling Spring Lakes	5	0	5
Holden Beach	230	1	229
Oak Island	258	3	255
Ocean Isle Beach	113	0	113
Southport	1	0	1
Sunset Beach	3	0	3
Unincorporated Brunswick County	29	4	25
New Hanover County	**262**	**8**	**254**
Carolina Beach	1	0	1
Wilmington	257	8	249
Unincorporated New Hanover County	4	0	4
Onslow County	**381**	**1**	**380**
Jacksonville	28	1	27
North Topsail Beach	226	1	225
Surf City	61	0	61
Swansboro	40	0	40
Unincorporated Onslow County	69	0	69
Pender County	**78**	**3**	**75**
Atkinson	2	0	2
Burgaw	24	1	23

Location	Number of Properties	Non Residential Properties	Residential Properties
Surf City	8	0	8
Topsail Beach	2	0	2
Watha	1	0	1
Unincorporated Pender County	41	2	39
Southeastern NC Regional Total	**1,388**	**20**	**1,368**

Source: National Flood Insurance Program

5.11.6 Probability of Future Occurrences

Flood events will remain a threat in the Southeastern NC Region, and the probability of future occurrences is likely (10-100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in **Figure 5.19 through 5:22** above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

5.12 TSUNAMIS

5.12.1 Background

The word tsunami is Japanese and means “harbor wave.” A tsunami is a wave or series of waves most commonly caused by an earthquake or by a large undersea landslide, volcanic eruption, or other undersea disturbances. From the area of disturbance, tsunami waves will travel outward in all directions and can originate hundreds or even thousands of miles away from affected coastal areas.

In the open ocean, tsunami waves travel at speeds of up to 600 miles per hour but are too small to be observed, and the time between wave crests may be 5 to 90 minutes. As the waves approach shallow coastal waters, they slow down and may rise to several feet or, in rare cases, up to 100 feet. Although the waves slow down as they reach shallow water, the energy remains constant. The first wave is almost never the largest; successive waves may be spaced ten or more minutes apart and continue arriving for many hours. The coastal areas at greatest risk are less than 50 feet above sea level and within one mile of the shoreline. Tsunamis can cause great loss of life and property damage where they come ashore, and most tsunami deaths are the result of drowning. Associated risks include water pollution, damaged gas lines, and flooding.

5.12.2 Location and Spatial Extent

Tsunami activity is possible along the East Coast of the United States, but is a greater risk along the Pacific Rim states (Washington, Oregon, California, Alaska, and Hawaii). As many as 40 tsunami or tsunami-like events have been reported along the East Coast since the early 1600s. Although an East Coast tsunami would be rare, two off-shore areas are currently under investigation according to a 2002 National Geophysical Data Center report. One area of interest consists of large cracks northeast of Cape Hatteras, North Carolina, that could foretell of the early stages of an underwater landslide resulting in a tsunami. The other area of interest consists of submarine canyons approximately 150 kilometers from Atlantic City, New Jersey. Significant factors for consideration with regard to these areas are recent discoveries along the East Coast that demonstrate the existence of pressurized hydrates and pressurized water layers in the continental shelf. This has produced speculation among the scientific community on possible triggers that could cause sudden and perhaps violent releases of compressed material that could factor into landslide events and the resulting tsunami waves.

The potential location and extent of the tsunami hazard for the Southeastern NC Region is similar and slightly more extensive than the established flood hazard area.

5.12.3 Historical Occurrences

Historical records do not indicate any past significant tsunami occurrences for the Southeastern NC Region.

5.12.4 Probability of Future Occurrences

The probability of a future tsunami event affecting the Southeastern NC Region is considered to be very low. They are considered to be possible but “unlikely.” However, the potential for tsunami impacts along the entire Eastern United States coast does exist as evidenced by other recorded tsunami occurrences in the area. Even upon impact, the consequences of a tsunami strike are thought to be low for the Region given off-shore terrain. Therefore, there is no indication that this hazard is a significant enough threat to the state or the Region to warrant further analysis or a detailed vulnerability assessment.

OTHER HAZARDS

5.13 WILDFIRES

5.13.1 Background

A wildfire is any outdoor fire (i.e. grassland, forest, brushland) that is not under control, supervised, or prescribed[18]. Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors.

[18] Prescription burning, or “controlled burn,” undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

Nationally, over 80 percent of wildfires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning. In North Carolina, 98 percent of wildfires are human-caused. The number one cause is woods arson, followed by debris burning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread by wind and move quickly by jumping along the tops of trees. Wildfires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping debris burning, construction, and other natural hazards (such as tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. The North Carolina wildfire season runs from late Winter to early spring with March being the most severe.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Further, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends and vacation periods. Unfortunately, wildland residents, and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic conditions losses as well. Businesses that depend on timber, such as paper miles and lumber companies, experience losses that are often passed along to consumers through higher prices, and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns.

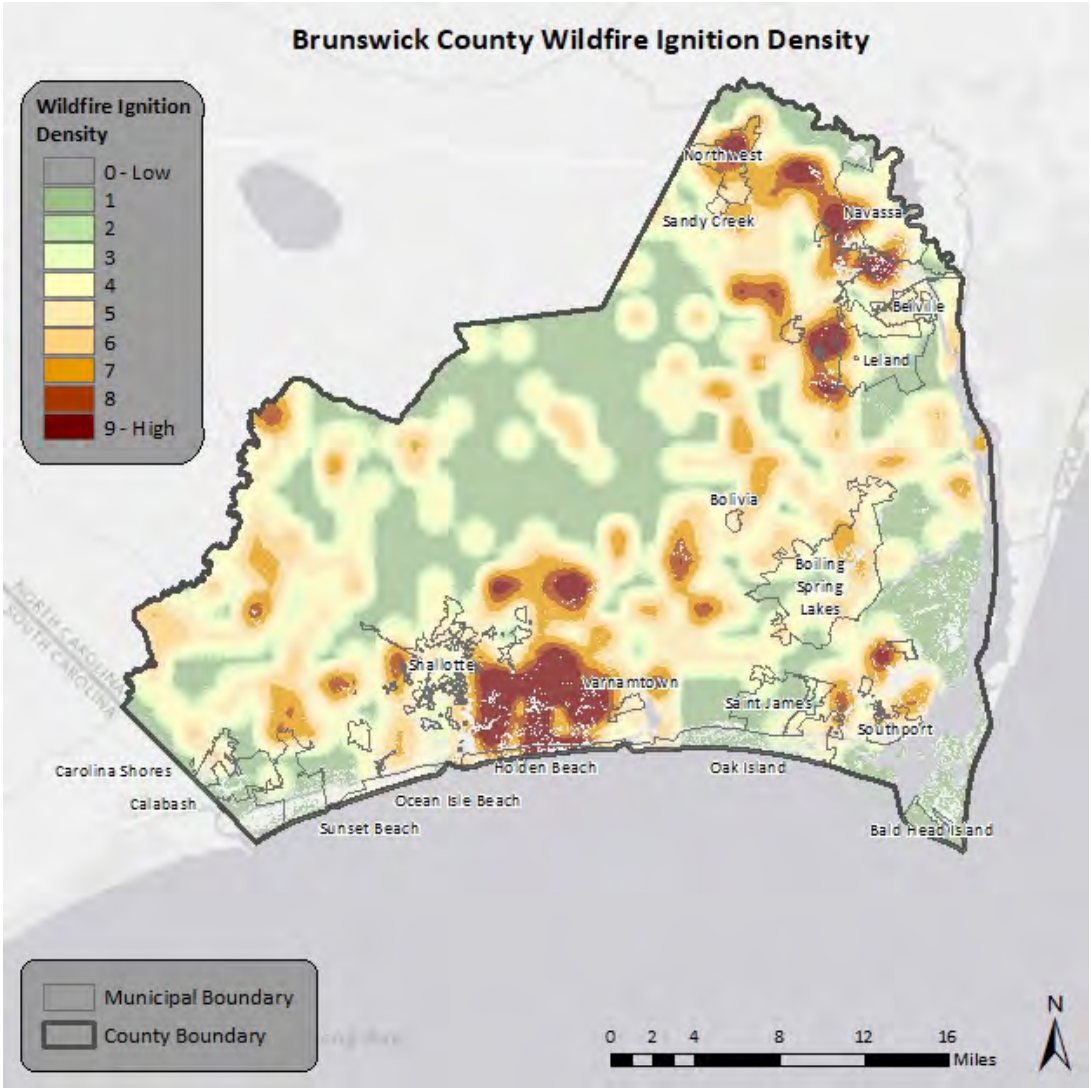
State and local governments can impose fire safety regulations on home sites and developments to help curb wildfire. Land treatment measures such as fire access roads, water storage, helipads, safety zones, buffers, firebreaks, fuel breaks, and fuel management can be designed as part of an overall fire defense system to aid in fire control. Fuel management, prescribed burning and cooperative land management planning can also be encouraged to reduce fire hazards.

5.13.2 Location and Spatial Extent

The entire region is a risk to a wildfire occurrence. However, drought conditions may make a fire more likely in those locations. Further, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas.

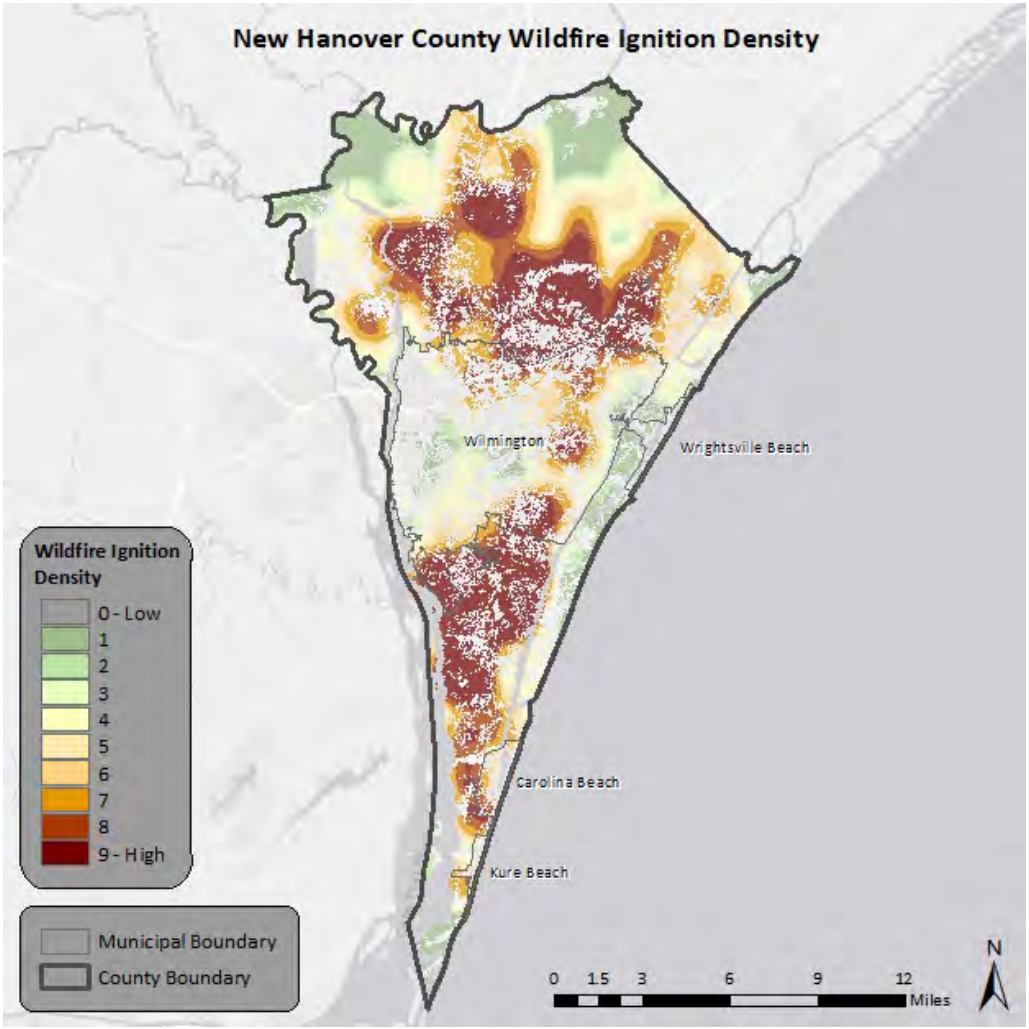
Figures 5.23-26 shows the Wildfire Ignition Density for each county in the Southeastern NC Region based on data from the Southern Wildfire Risk Assessment. This data represents the likelihood of wildfire igniting in the area, which is derived from historical wildfire occurrences to create an average ignition rate map. Jurisdiction-specific maps of this data can be found in Appendix G.

FIGURE 5.23: WILDFIRE IGNITION DENSITY IN BRUNSWICK COUNTY



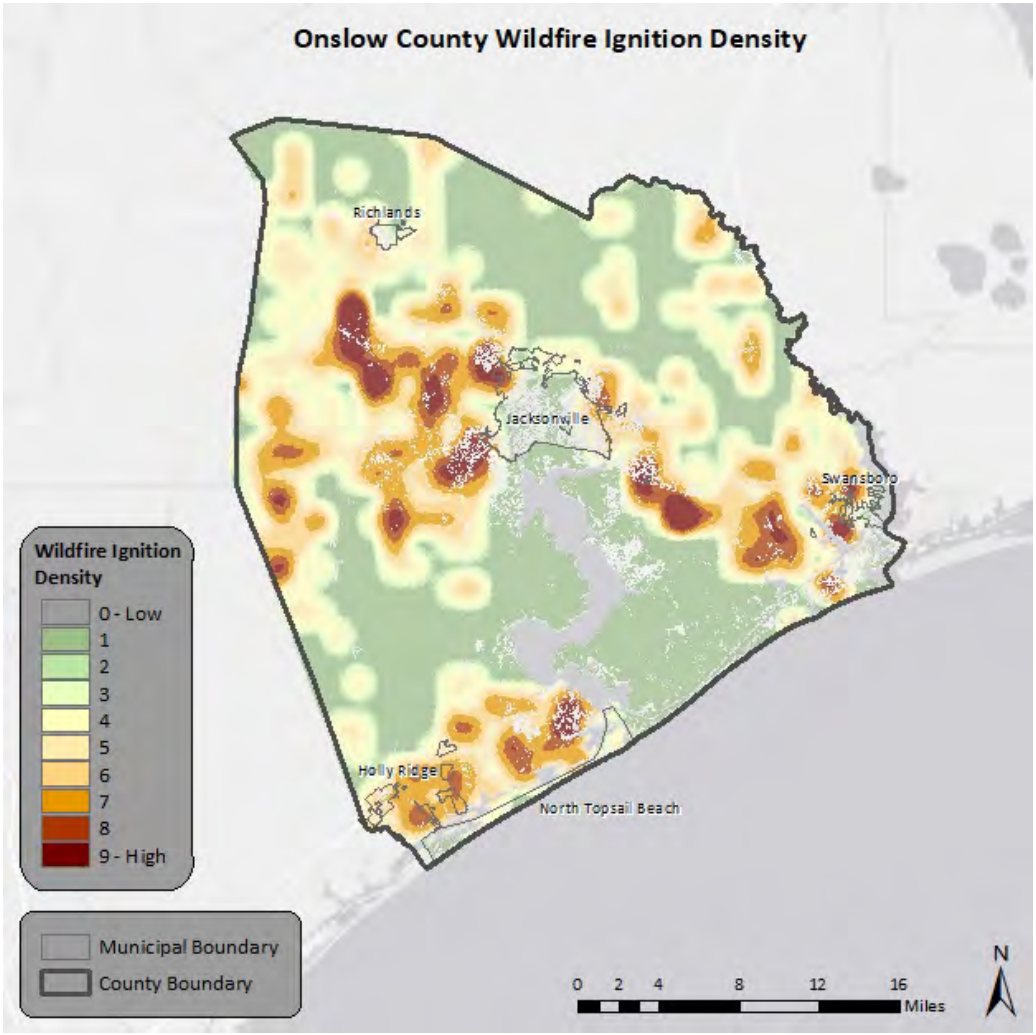
Source: Southern Wildfire Risk Assessment

FIGURE 5.24: WILDFIRE IGNITION DENSITY IN NEW HANOVER COUNTY



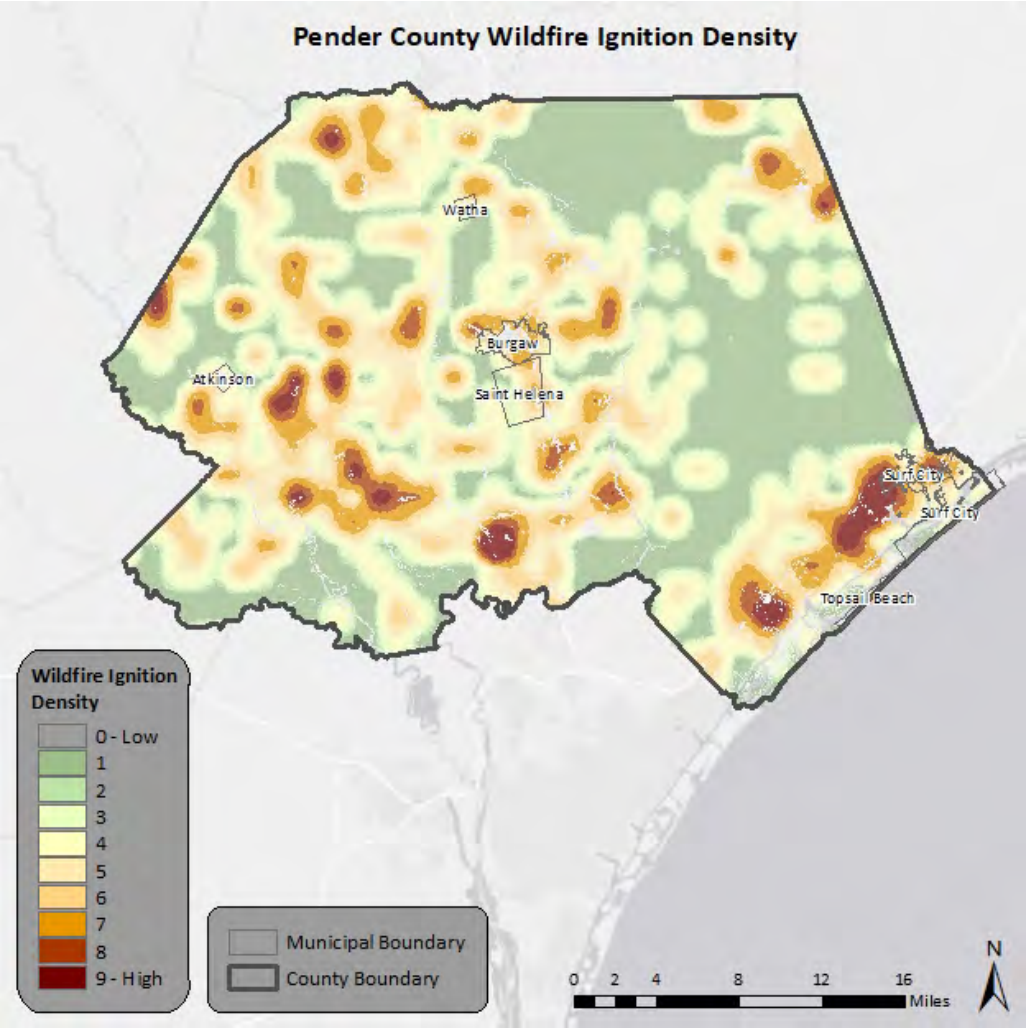
Source: Southern Wildfire Risk Assessment

FIGURE 5.25: WILDFIRE IGNITION DENSITY IN ONSLOW COUNTY



Source: Southern Wildfire Risk Assessment

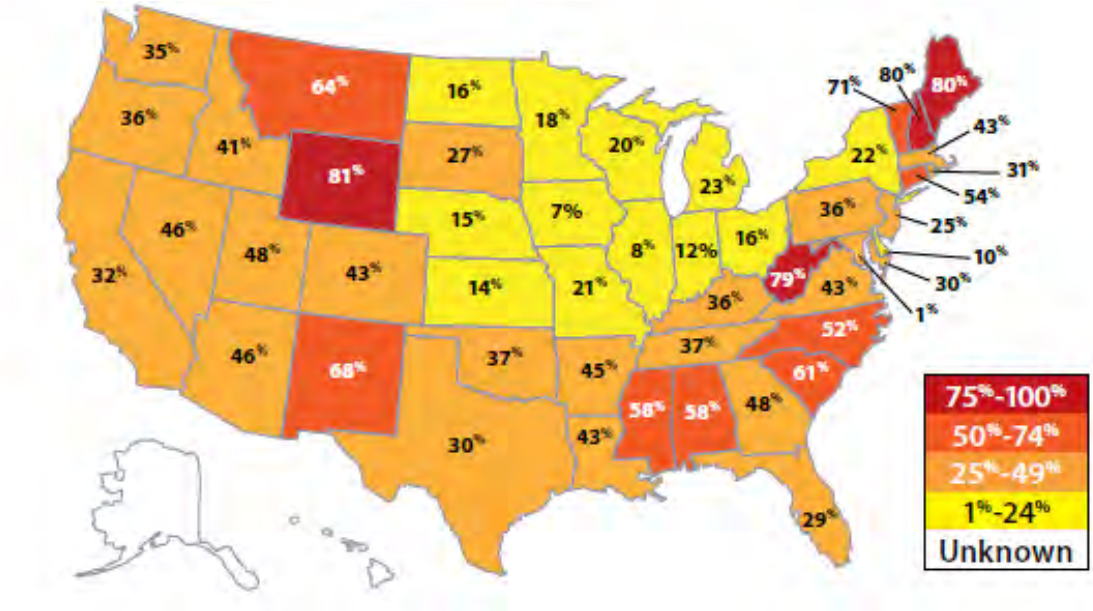
FIGURE 5.26: WILDFIRE IGNITION DENSITY IN PENDER COUNTY



Source: Southern Wildfire Risk Assessment

Every state also has a Wildland Urban Interface (WUI), which is the rating of potential impact of wildfires on people and their homes. The WUI is not a fixed geographical location, but rather a combination of human development and vegetation where wildfires have the greatest potential to result in negative impacts. Nationally, one-third of all homes lie in the WUI, which is a growing danger. Below, **Figure 5.27** shows a map of each state's WUI. Based on the data from the US Department of Agriculture, 52% of homes in North Carolina lie within the WUI.

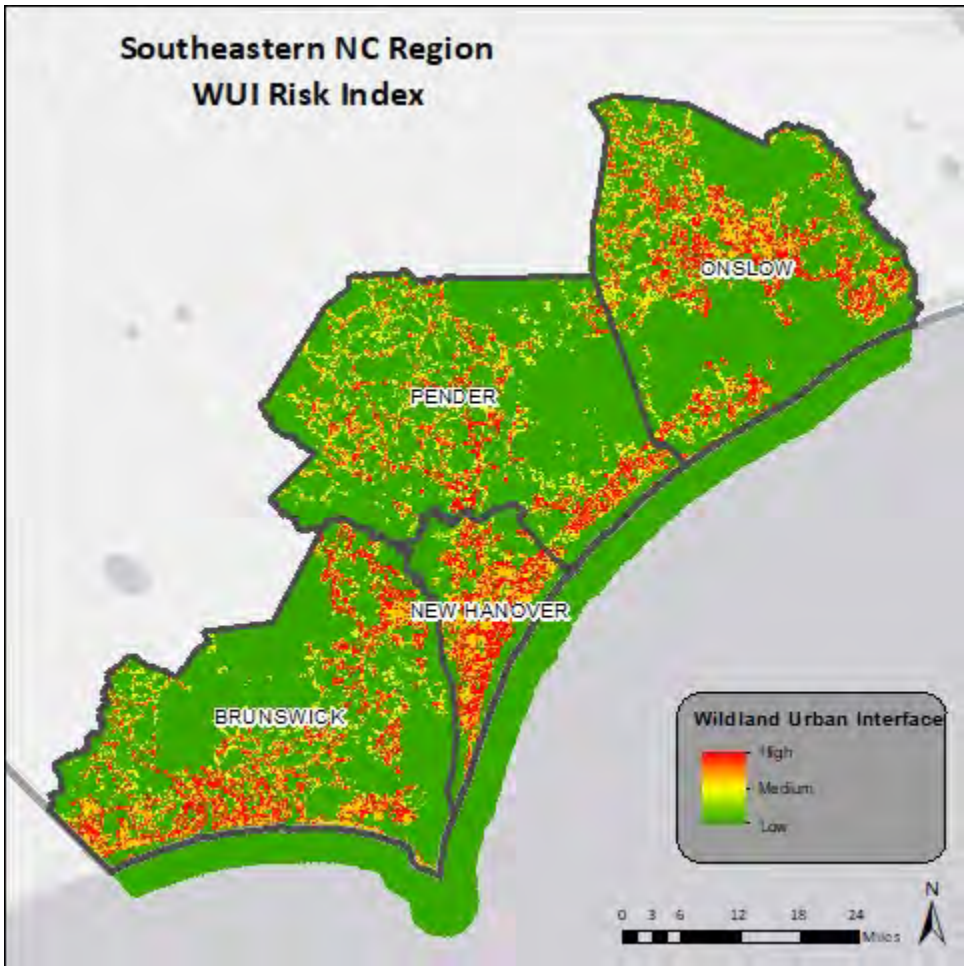
FIGURE 5.27: PERCENT OF TOTAL HOMES IN THE WILDLAND URBAN INTERFACE



Source: US Department of Agriculture

Below, **Figure 5.28** displays the WUI Risk Index for the counties in the Southeastern NC Region. Jurisdiction-specific maps of this data can be found in Appendix G.

FIGURE 5.28: SOUTHEASTERN NC WILDLAND URBAN INTERFACE RISK INDEX



Source: Southern Wildfire Risk Assessment

5.13.3 Historical Occurrences

Information from the National Association of State Foresters was used to ascertain historical wildfire events. The National Association of State Foresters reported that a total of 1,704 events that impacted an area greater than 1 acre have occurred throughout the Southeastern NC Region since 2001[19]. A majority of the wildfires within the SENC community occurred at or near natural wildlife sanctuaries. As the population continues to grow within the region, more houses and communities will be at risk from wildfires in wildfire prone areas.

A summary of these events is presented in **Table 5.29**. The largest of these events was the Juniper Road fire which occurred in Pender County and burned 31,140 acres.

[19] There events are only inclusive of those reported by NASFI. It is likely that additional occurrences have occurred and have gone unreported.

TABLE 5.29: SUMMARY TABLE OF WILDFIRE INCIDENTS (2001 -2018)

Location	Number of Wildfires	Total Acres Burned
Brunswick County	**599**	**13,640.64**
Bald Head Island	0	0
Belville	0	0
Boiling Spring Lakes	0	0
Bolivia	0	0
Calabash	0	0
Carolina Shores	0	0
Holden Beach	0	0
Leland	11	50.5
Navassa	0	0
Northwest	9	46.5
Oak Island	1	1
Ocean Isle Beach	1	1
Sandy Creek	1	2
Shallotte	15	58.3
Southport	3	9.5
St. James	0	0
Sunset Beach	2	14
Varnamtown	0	0
Unincorporated Area	556	13,457.84
New Hanover County	**118**	**1,954.64**
Carolina Beach	1	2
Kure Beach	0	0
Wilmington	22	151.64
Wrightsville	0	0
Unincorporated Area	50	1,803
Onslow County	**544**	**5,877.96**
Holly Ridge	6	15.98
Jacksonville	6	21.5
North Topsail Beach	1	1.5
Richlands	0	0
Swansboro	0	0
Unincorporated Area	531	5,838.98
Pender County	**443**	**38,509.68**
Atkinson	0	0
Burgaw	4	31
St. Helena	1	10.5
Surf City	3	7.1
Topsail Beach	0	0
Watha	3	5.56
Unincorporated Area	432	38,455.52
Southeastern NC REGION TOTAL	**1,704**	**59,982.92**

Source: National Centers for Environmental Information

Below are accounts of the largest/significant wildfires within the Southeastern NC counties listed in **Table 5.29**.

Brunswick County

While there have been no major wildfire events in Brunswick County, there have been several hundred acres burned by wildfires within the county. Small wildfires have occurred east of I-140 in Leland, NC along Highway 87. A 1,400-acre wildfire burned near Wilmington in 2016, which coincided with wildfires

which were raging across the Southeast. Another wildfire burned 10 acres near the Windsor Park housing complex and the Mount Misery fire burned about 500 acres in April 2015, and threatened about 89 homes. A majority of the fires coincide with years in the Southeastern NC region where drought conditions were at their peak. For example, during the 2007 Wildfire Season when drought conditions in the SENC region were listed as "Extreme" to "Exceptional"; in **Table 5.5**, a total of 69 fires broke out within the county, the highest number recorded in the last 17 years.

New Hanover County

One of the largest fires in New Hanover County occurred near the Castle Hayne area on Edna Buck Road. The wildfire burned over 1,500 acres of woods between Edna Buck Road and Holly Shelter Road. The fire lasted for 7-10 days because the fire was fueled by organic soil and peat moss which, according to North Carolina Department of Environmental Quality "could take months to burn out without substantial rain"[20].

Onslow County

A number of smaller fires have broken out within Onslow County. The highest number of wildfires occurred in years with the highest drought index occurrences. Wildlife sanctuary's and other natural areas are at the highest risk for wildfire occurrences. A number of acres on the west side of Wilmington Highway 17 along Mill Run Creek have had wildfire occurrences over the last 17 years. Because of increasing occurrences of years with major droughts across the state, and the abundance of natural fuel sources for these wildfires to feed off of, these relatively isolated areas make tracking these wildfires difficult.

Pender County

Although there were a number of smaller contained fires within Pender County, the Juniper Road fire was the largest wildfire reported in the last 17 years and burned 31,140 acres. The fire was started in the Holly Shelter Game Land from a lightning strike in May 2011. The fire cost the county a total of over $3.5 million dollars to contain and put more than 2,000 homes along Highway 17 at risk. The homes, which are located west of the Holly Shelter Game Lands along Highway 17, were under significant threat from the Juniper Road fire due to their close proximity downwind from the blaze.

5.13.4 Probability of Future Occurrences

Wildfire events will continue to occur in the Southeastern NC Region. The likelihood of a wildfire increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the wildland urban index boundary. The risk will also vary due to assets. Areas in the wildland urban interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the Southeastern NC Region for future wildfire events are likely (10 to 100 percent annual probability).

[20] https://files.nc.gov/ncdeq/Air%20Quality/monitor/specialstudies/exceptionalevents/2008/Exceptional%20Event%20Edna%20Buck%20Road%20Fire.pdf

5.14 INFECTIOUS DISEASE

5.14.1 Background and Description

For the purpose of this plan, this section will assess infectious diseases and vector-borne diseases within the Southeastern NC Region.

Infectious Disease

Communicable, or infectious, diseases are conditions that result in clinically evident illness which are transmissible directly from one person to another or indirectly through vectors such as insects, air, water, blood, or other objects. The impact of communicable disease can range from the mild effects of the common cold to the extreme lethality of pneumonic plague or anthrax. The public health system in the United States was developed in large part as a response to the often urgent need to respond to or prevent outbreaks of communicable diseases. Through public health methods of disease reporting, vaccinations, vector control, and effective treatments; most communicable diseases are well controlled in the United States and across the Southeastern NC Region. However, control systems can fail and when people come together from locations outside of the state, outbreaks can occur, even in the most modern of communities. In this section, some of the more significant potential communicable disease concerns are described.

The threats discussed in this section usually do not occur on a regular basis, though some are more frequent. The diseases described herein do not originate from intentional exposure (such as through terrorist actions) but do not present significant issues and concerns for the public health community. There are numerous infectious diseases that rarely, if ever, occur in the State of North Carolina, such as botulism or bubonic plague. Some highly dangerous diseases which could potentially be used as a biological weapon, such as anthrax, pneumonic plague, and smallpox, are safely housed and controlled in laboratory settings such as the Center for Disease Control and Prevention (CDC). Other diseases have not (yet) mutated into a form that can infect humans, or otherwise lie dormant in nature.

There have been several significant viral outbreaks from emerging diseases in recent years of both national and international importance. The Zika virus and West Nile virus are viruses that are typically passed to humans or animals by mosquitoes and made major news as emergent disease threats. Meanwhile, diseases that are spread directly between human beings such as Severe Acute Respiratory Syndrome (SARS) and Ebola have also been identified as serious threats. While each of these conditions caused a great deal of public health concern when they were first identified, SARS have virtually disappeared, West Nile virus occurs with low frequency and causes serious disease in only a very small percentage of cases, Ebola have been more or less contained and a vaccine is in development, and many people infected with Zika will not experience symptoms from the disease.

Other communicable diseases pose a much more frequent threat to the citizens of in the region. Some of the infectious diseases of greatest concern include influenza, particularly in a pandemic form, as well as norovirus, and multiple antibiotic-resistant tuberculosis. Even in one of its normal year-to-year variants, influenza (commonly referred to as “flu”) can result in serious illness and even death in young children, and elderly and immune-compromised persons, But there is always the potential risk of the emergence of influenza on one of the pandemic H1N1 from, such as the “Spanish” outbreak of 1918-

1919, which killed over 50 million people worldwide. Every year, North Carolina sees hundreds of cases of influenza, leading to hundreds of hours of lost productivity in businesses due to sick employees. Of note, a vaccine for influenza is produced every year and, according to the CDC, is highly effective in preventing the disease.

Norovirus is recognized as the leading cause of foodborne-disease outbreaks in the United States. The virus can cause diarrhea, vomiting, and stomach pain, and is easily spread from person to person through contaminated food or water, and by surface to surface contact. Especially vulnerable populations to this virus include those living or staying in nursing homes and assisted living facilities and other healthcare facilities, such as hospitals. Norovirus could also be a threat in the event of large public gatherings such as: sporting events, concerts, festivals, and so forth. North Carolina often experiences norovirus outbreaks on an annual basis. No vaccine or treatment exists for Norovirus, making it especially dangerous for the public in the event of an outbreak.

Public health threats can occur at any time and can have varying impacts. Discussions between public health professionals, planning officials, and first response agencies are essential in order to facilitate safe, effective, and collaborative efforts toward outbreaks.

Vector-Borne Disease

Bacterial, viral, and parasitic diseases that are transmitted by mosquitoes, ticks, and fleas are collectively called “vector-borne diseases” (the insects and arthropods are the “vectors” that carry the diseases). Although the term “vector” can also apply to other carriers of disease – such as mammals that can transmit rabies or rodents that can transmit hantavirus – those diseases are generally called zoonotic (animal-borne) diseases.

The most common vector-borne diseases found in North Carolina and the Southeastern NC Region are carried by ticks and mosquitoes. The tick-borne illnesses most often seen in the state are Rocky Mountain Spotted Fever, ehrlichiosis, Lyme disease and Southern Tick-Associated Rash Illness (STARI). The most frequent mosquito-borne illnesses, or “arboviruses,” in North Carolina include La Crosse encephalitis, West Nile virus and Eastern equine encephalitis. An outbreak of the West Nile Virus began showing up in the United States in 1999, with North Carolina reporting 63 cases from that time through the end of 2016.

5.14.2 Location and Spatial Extent

Extent is difficult to measure for an infectious disease event as the extent is largely dependent on the type of disease and on the effect that it has on the population (discussed above). Extent can be somewhat defined by the number of people impacted, which depending on the type of disease could number in the tens of thousands within the state.

5.14.3 Historical Occurrences

Infectious Disease

Information from the North Carolina Department of Health and Human services was used to monitor and track cases of the infectious disease COVID-19. A COVID – 19 Pandemic disaster declaration was

declared for North Carolina on March 24, 2020. **Table 5.30** provides a summary of confirmed cases of COVID–19 in the Southeastern NC Region.

TABLE 5.30: SUMMARY OF CONFIRMED COVID – 19 CASES IN THE SOUTHEASTERN NC REGION

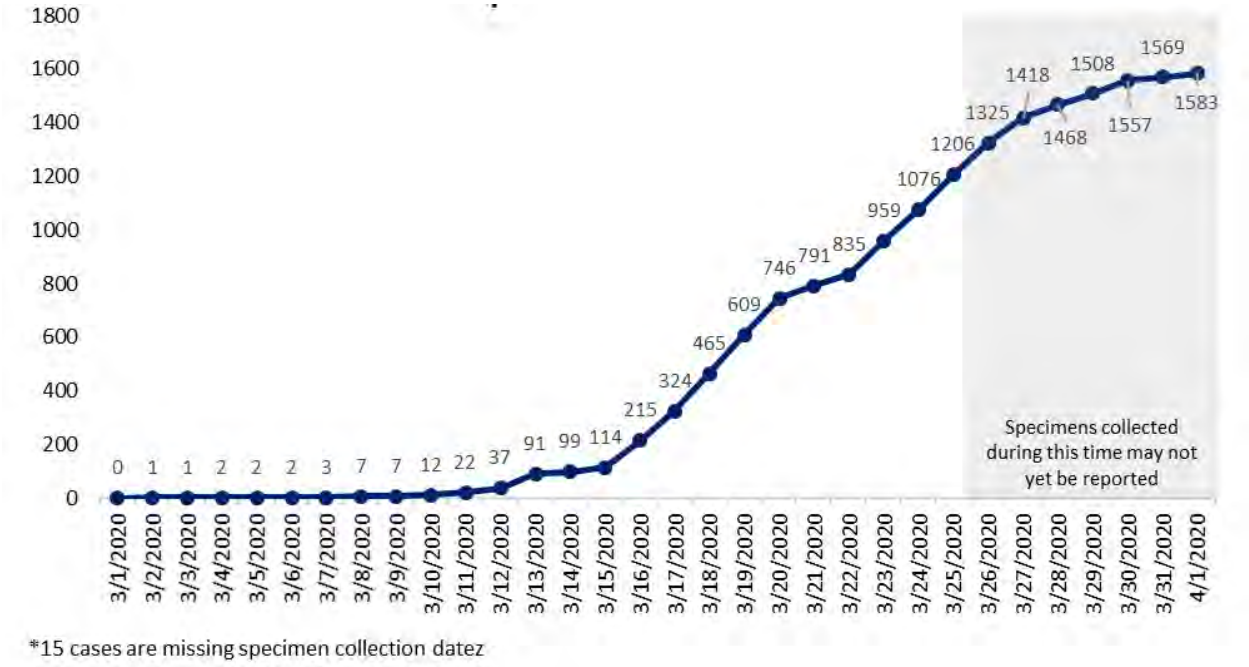
Location	Number of Cases	Number of Deaths*
Brunswick County	**19**	**0**
New Hanover County	**33**	**0**
Onslow County	**8**	**1**
Pender County	**-**	**-**
Southeastern NC Region Total	**60**	**1**

Source: North Carolina Department of Health and Human Services
** Deaths reflect deaths in persons with laboratory-confirmed COVID-19 reported by local health departments to the NC Department of Health and Human Services*
*** All data are preliminary and might change as cases are investigated. Numbers may not sum to 100% due to rounding*

As of April 2, 2020, NC DHHS reported there were 1,857 cases of COVID – 19 in North Carolina[21]. These cases reflect cases that were tested and returned positive, including the NC State Laboratory of Public Health and reporting hospital and commercial labs. **Figure 5.29** below provides an overview of the total number of COVID-19 cases by date of specimen collection for North Carolina.

[21] https://www.ncdhhs.gov/covid-19-case-count-nc#by-counties

FIGURE 5.29: CUMULATIVE TOTAL NUMBER OF COVID-19 CASES BY DATE OF SPECIMEN COLLECTION*



Source: North Carolina Department of Health and Human Services
** All data are preliminary and might change as cases are investigated. Numbers may not sum to 100% due to rounding.*

Vector-Borne Diseases

In 2016, North Carolina state health officials encouraged citizens to take preventative measures against mosquito bites to avoid contracting the Zika virus. $477,500 was allocated from the Governor's yearly budget to develop an infrastructure to detect, prevent, control, and respond to the Zika virus and other vector-borne illnesses[22].

5.14.4 Probability of Future Occurrence

It is difficult to predict the future probability of infectious diseases due to the difficulty with obtaining information on this type of hazard. The most common and probable disease in the state has shown to be influenza; however, based on historical data, it is relatively unlikely (between 1 and 33.3 percent annual probability) that the Southeastern NC region will experience an outbreak of infectious diseases in the future.

[22] https://www.ncdhhs.gov/news/press-releases/nc-prepared-zika-virus-risk-local-virus-carrying-mosquitoes-low

TECHNOLOGICAL HAZARDS

5.15 HAZARDOUS SUBSTANCES

5.15.1 Background and Description

Hazardous materials can be found in many forms and quantities that can potentially cause death, serious injury, long-lasting health effects and damage to buildings, homes and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and FEMA-identified fixed HAZMAT sites determined to be of greatest significance as appropriate for the purposes of this plan.

Hazardous materials (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 on railroad incidents and 266 are due to other causes.[23] In essence, HAZMAT incidents can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.

HAZMAT incidents can also occur as a result or of in tandem with natural hazard events, such as floods, hurricanes, tornadoes and earthquakes, which in addition to causing incidents can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that caused widespread toxological concern.

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude: (1) any release which results in exposure to poisons solely within the workplace with respect to claims which such persons may assert against the employer of such persons; (2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine; (3) release of source, byproduct, special nuclear material from a nuclear accident; and (4) the normal application of fertilizer.

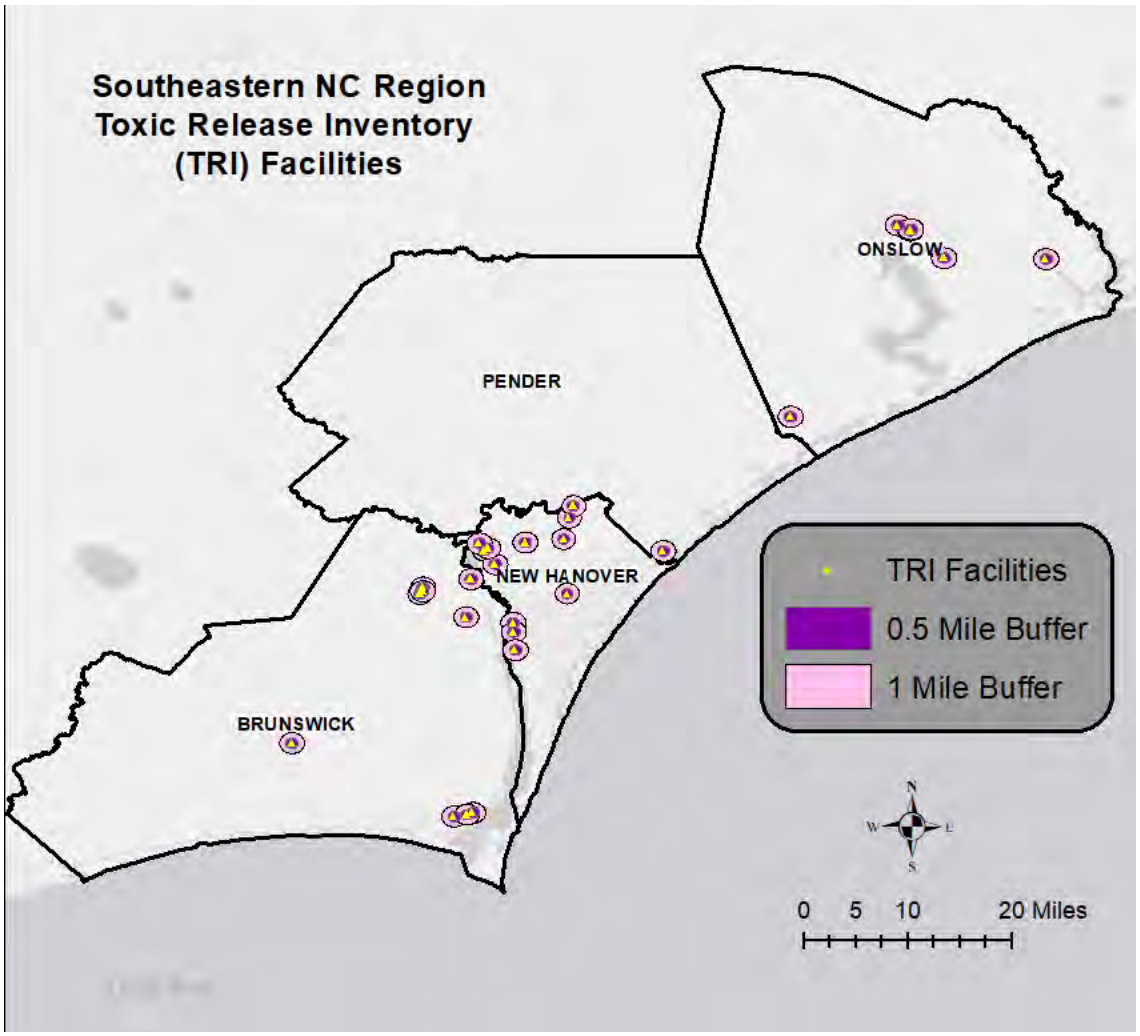
5.15.2 Location and Spatial Extent

As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the Environmental Protection Agency provides public information on hazardous materials. One facet of this program is to collect information from the industrial facilities on the releases and transfers of certain toxic agents. This information is then reported in the Toxic Release Inventory (TRI). TRI sites indicate

[23] FEMA, 1997.

where such activity is occurring. The Southeastern NC Region has 17 TRI sites. These sites are shown in **Figure 5.30**.

FIGURE 5.30: TOXIC RELEASE INVENTORY (TRI) SITES IN THE SOUTHEASTERN NC REGION



Source: EPA

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the region via roadways and rail. Many roads in the region are narrow and winding, making hazardous material transport in the area especially treacherous. All roads that permit hazardous material transport are considered potentially at risk to an incident.

5.15.3 Historical Occurrences

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) is an agency of the United States Department of Transportation that was established in 2004. The PHMSA maintains a database of hazardous materials incidents for communities across the United States. A "serious incident" is a hazardous materials incident that involves:

- a fatality or major injury caused by the release of a hazardous material,
- the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire,
- a release or exposure to fire which results in the closure of a major transportation artery, the alteration of an aircraft flight plan or operation,
- the release of radioactive materials from Type B packaging,
- the release of over 11.9 galls or 88.2 pounds of a severe marine pollutant, or
- the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material.

However, prior to 2002, a hazardous material "serious incident" was defined as follows:

- a fatality or major injury due to a hazardous material,
- closure of a major transportation artery or facility or evacuation of six or more person due to the presence of hazardous material, or
- a vehicle accident or derailment resulting in the release of a hazardous material.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is an agency of the United States Department of Transportation that was established in 2004. The PHMSA maintains a database of hazardous materials incidents for communities across the United States. Summary results of their data for events that have occurred in the Southeastern NC region can be found in **Table 5.31.**

TABLE 5.31: SUMMARY OF HAZMAT INCIDENTS IN THE SOUTHEASTERN NC REGION

Location	Incidents Reported	Injuries	Fatalities	Type	Costs
Brunswick County	**3**	**0**	**0**		**$74,800**
Bald Head Island	0	0	0	n/a	$0
Belville	0	0	0	n/a	$0
Boiling Spring Lakes	0	0	0	n/a	$0
Bolivia	0	0	0	n/a	$0
Calabash	0	0	0	n/a	$0
Carolina Shores	0	0	0	n/a	$0
Holden Beach	0	0	0	n/a	$0
Leland	2	0	0	Highway	$15,000
Navassa	0	0	0	n/a	$0
Northwest	0	0	0	n/a	$0
Oak Island	0	0	0	n/a	$0
Ocean Isle Beach	0	0	0	n/a	$0
Sandy Creek	0	0	0	n/a	$0
Shallotte	0	0	0	n/a	$0
Southport	0	0	0	n/a	$0
St. James	0	0	0	n/a	$0
Sunset Beach	0	0	0	n/a	$0
Varnamtown	0	0	0	n/a	$0
Unincorporated Area	1	0	0	Highway	$59,800
New Hanover County	**15**	**0**	**0**		**$421,700**

Location	Incidents Reported	Injuries	Fatalities	Type	Costs
Carolina Beach	1	0	0	Highway	$5,000
Kure Beach	0	0	0	n/a	$0
Wilmington	14	0	0	Highway	$416,700
Wrightsville	0	0	0	n/a	$0
Unincorporated Area	0	0	0	n/a	$0
Onslow County	**2**	**0**	**0**		**$3,600**
Holly Ridge	0	0	0	n/a	$0
Jacksonville	2	0	0	Highway and Rail	$3,600
North Topsail Beach	0	0	0	n/a	$0
Richlands	0	0	0	n/a	$0
Swansboro	0	0	0	n/a	$0
Unincorporated Area	0	0	0	n/a	$0
Pender County	**0**	**0**	**0**	**0**	**$0**
Atkinson	0	0	0	n/a	$0
Burgaw	0	0	0	n/a	$0
St. Helena	0	0	0	n/a	$0
Surf City	0	0	0	n/a	$0
Topsail Beach	0	0	0	n/a	$0
Watha	0	0	0	n/a	$0
Unincorporated Area	0	0	0	n/a	$0
Southeastern NC REGION TOTAL	**19**	**0**	**0**		**$440,300**

Source: US Department of Transportation Pipeline and Hazardous Materials Safety Administration

5.15.4 Probability of Future Occurrence

Given the location of seventeen toxic release inventory sites, it is possible that a hazardous material incident may occur (between 1 and 10 percent annual probability). County and municipal officials are mindful of this possibility and take precautions to prevent such an event from occurring.

5.16 RADIOLOGICAL EMERGENCY – FIXED NUCLEAR FACILITIES

5.16.1 Background and Description

Although not referenced in the previous Southeastern NC Regional Hazard Mitigation Plan, radiological emergencies will be assessed in this update.

A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to people, the environment or the facility. Often, this type of incident results from damage to the reactor core of a nuclear power plant which can release radioactivity into the environment. The degree of exposure from nuclear accidents has varied from

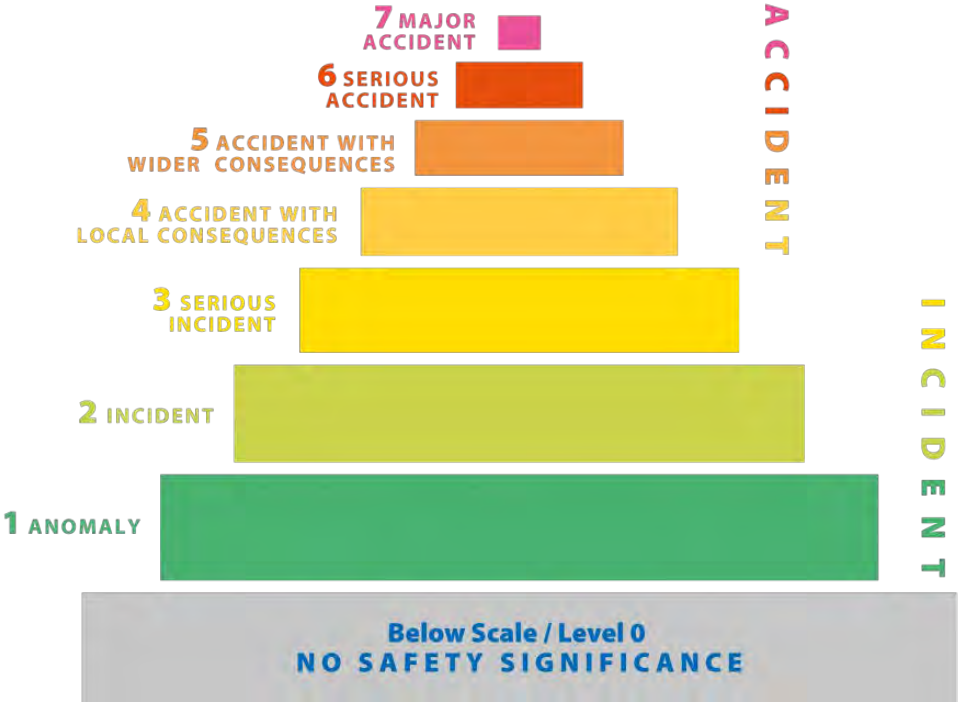
serious to catastrophic. While radiological emergencies generally are a rare occurrence, many incidents are extremely well known due to their large-scale impact and serious effects on people and the environment.

The Brunswick Nuclear Plant is located just north of Southport, North Carolina on the Cape Fear River. The plant is a two-unit boiling water reactor location, and the units commenced operation in 1975 and 1977. This was the first nuclear power plant built in North Carolina and it has a capacity of 1,870 megawatts.

5.16.2 Location and Spatial Extent

The entire region is at risk to a nuclear incident. Covering 1,200 acres, the plant is less than thirty miles outside of downtown Wilmington, and is just outside of the City limits of Southport. The International Atomic Energy Association has developed a scale called the International Nuclear and Radiological Event Scale (INES) which provides a quantitative means of assessing the extent of a nuclear event. This scale, like the MMI used for earthquakes, is logarithmic which means that each increasing level on the scale represents an event 10 times more severe than the previous level (**Figure 5.31**).

FIGURE 5.31: INTERNATIONAL NUCLEAR EVENT SCALE



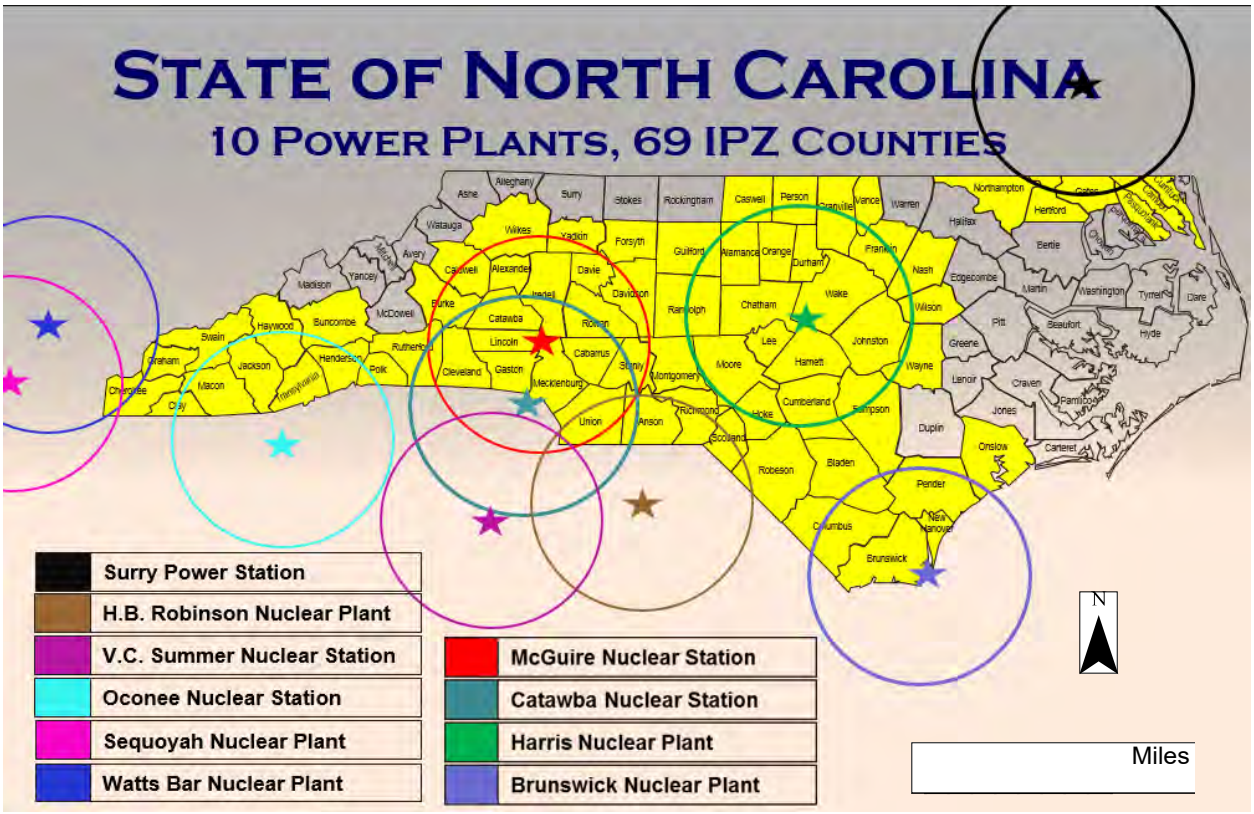
Source: International Atomic Energy Agency

The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants. Areas located within 10 miles of the station are considered to be within the zone of highest risk to a nuclear incident and this radius is the designated evacuation radius recommended by the Nuclear Regulatory Commission. Within the 10-mile zone, the primary concern is exposure to and inhalation of radioactive contamination. The most concerning effects in the secondary 50-mile zone are related to ingestion of food and liquids that may have been contaminated. All areas of the counties that are not

located within the 10-mile radius are located within this 50-mile radius that is still considered to be at risk from a nuclear incident

The Brunswick Nuclear Plant is located within the Southeastern NC Region, therefore, the 50-mile buffer zone covers all four of the participating counties, as seen in **Figure 5.32** below.

FIGURE 5.32: NORTH CAROLINA NUCLEAR POWER STATION INCIDENT HAZARD ZONE



Source: NCEM

5.16.3 Historical Occurrences

Although there has been no major nuclear event at the Brunswick Nuclear Power Plant there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

5.16.4 Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulations of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

5.17 TERRORISM

5.17.1 Background and Description

Terrorism was not referenced in the previous Southeastern NC Regional Hazard Mitigation Plan, but is addressed in this update. For the purpose of this report, terrorism encompasses explosive, chemical, radiological, biological, nuclear, and other threats.

Terrorism is defined in the United States by the Code of Federal Regulations is "the unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof, in furtherance of political or social objectives." Terrorist acts may include assassinations, kidnappings, hijackings, bombings, small arms attacks, vehicle ramming attacks, edged weapon attacks, incendiary attacks, cyber-attacks (computer based), and the use of chemical, biological, nuclear and radiological weapons. For the purposes of this plan, cyber-attacks are included as a separate hazard.

Historically the main categories of weapons of mass destruction (WMDs) used in terror attacks are Chemical, Biological, Radiological, Nuclear, and Explosive (collectively referred to as CBRNE). As we rank these categories, considering immediate danger posed, impact, probability, technical feasibility, frequency, and historical success, they are typically ranked in the following way.

Explosive
Explosive attacks lead all others due to their immediate danger to life and health, immediate and measurable impact, high probability, low cost/easy degree of technical feasibility, and a long history of successful attacks.

Chemical
Chemical attacks can pose immediate danger to life and health depending upon the materials used. Chemicals are easy to access, low cost, and easy to deploy. Chemical terrorism can have high and persistent impacts to people and places. These types of attacks are probable and have enjoyed historical success.

Radiological
Radiological attacks can pose significant threats to life and health depending upon the specific materials used. Radiological materials while restricted and regulated are accessible to people with some knowledge in this discipline. While radiological incidents have occurred, they occur less frequently than explosive and chemical attacks.

Biological
Biological attacks can pose significant threats to life and health. They are typically deployed as diseases and bio-toxins. They require some degree of technical expertise in order to be deployed successfully. While biological incidents have occurred, they occur less frequently than explosive and chemical attacks.

Nuclear
While yielding a very high impact, the Nuclear attack is extremely rare due to the fact that it is cost prohibitive and very technically difficult to achieve. This type of attack, however, could be state sponsored which makes it viable.

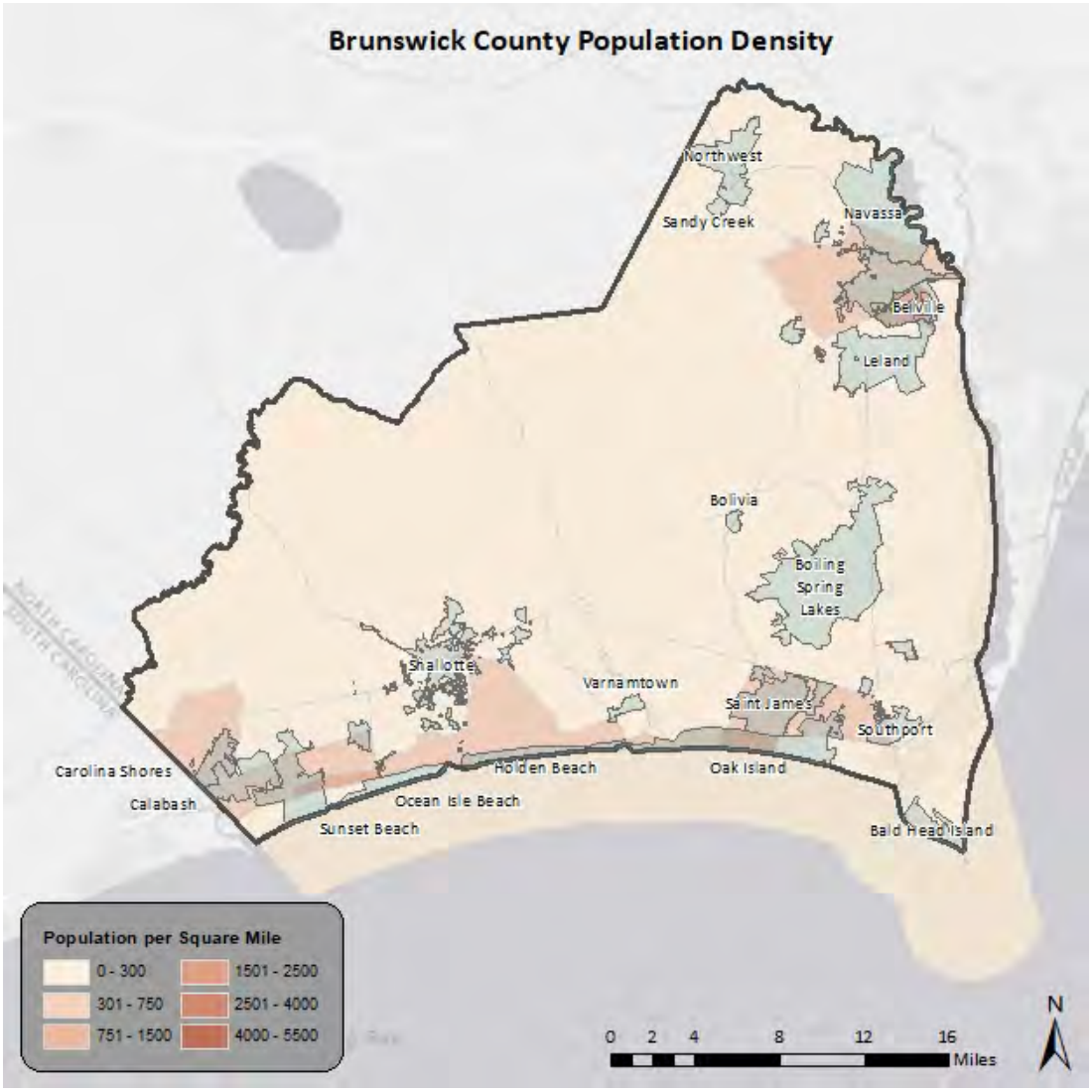
Other

Terrorism Hazard Assessment must also account for modern trends and changes. An additional "OTHER" category should be considered that includes small arms attacks, vehicle ramming attacks, edged weapon attacks, and incendiary attacks.

5.17.2 Location and Spatial Extent

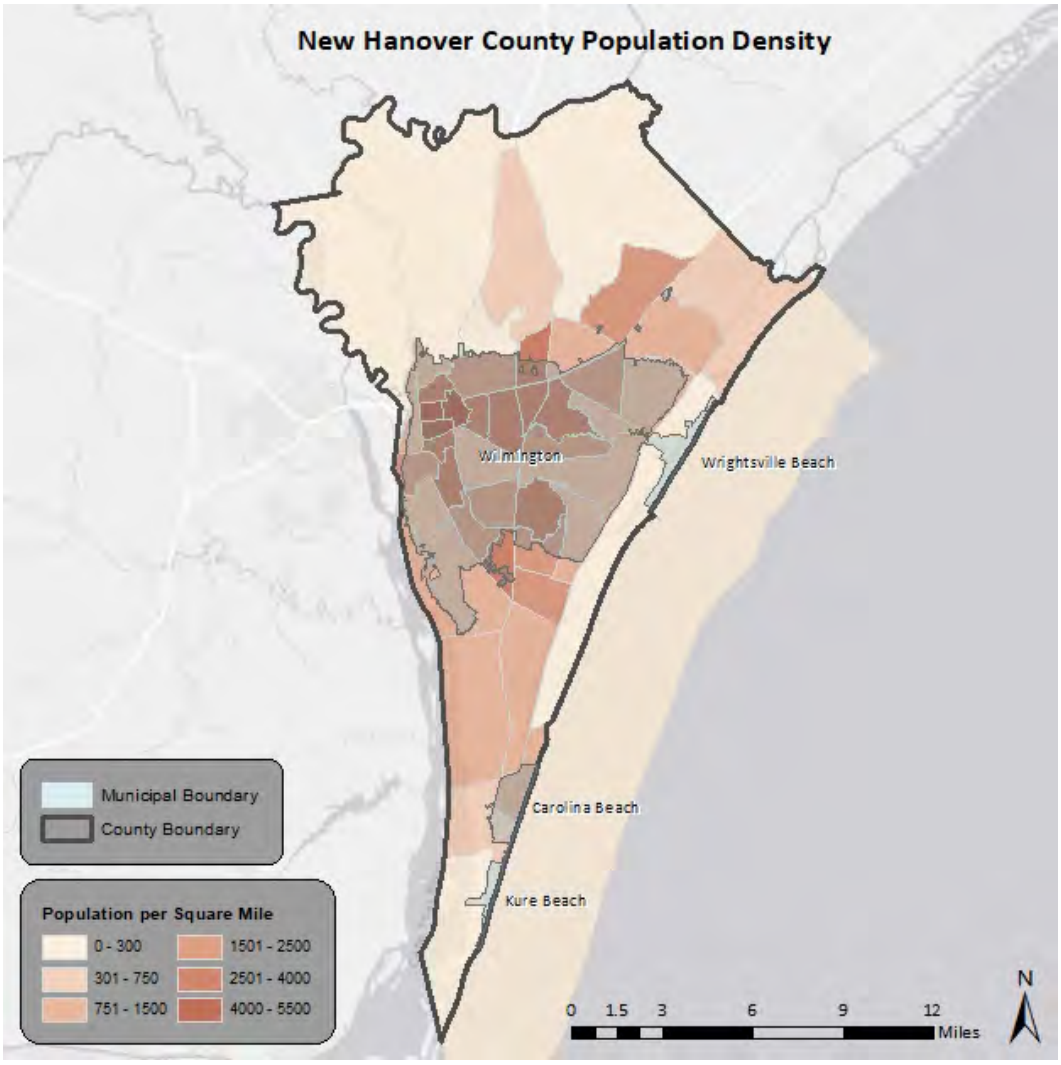
All parts of North Carolina are vulnerable to a terror event; however, terrorism tends to target more densely populated areas. The maps in **Figure 5.33 through 5.36** display the population density in each county in the Southeastern NC region using census tract levels.

FIGURE 5.33: POPULATION DENSITY IN BRUNSWICK COUNTY



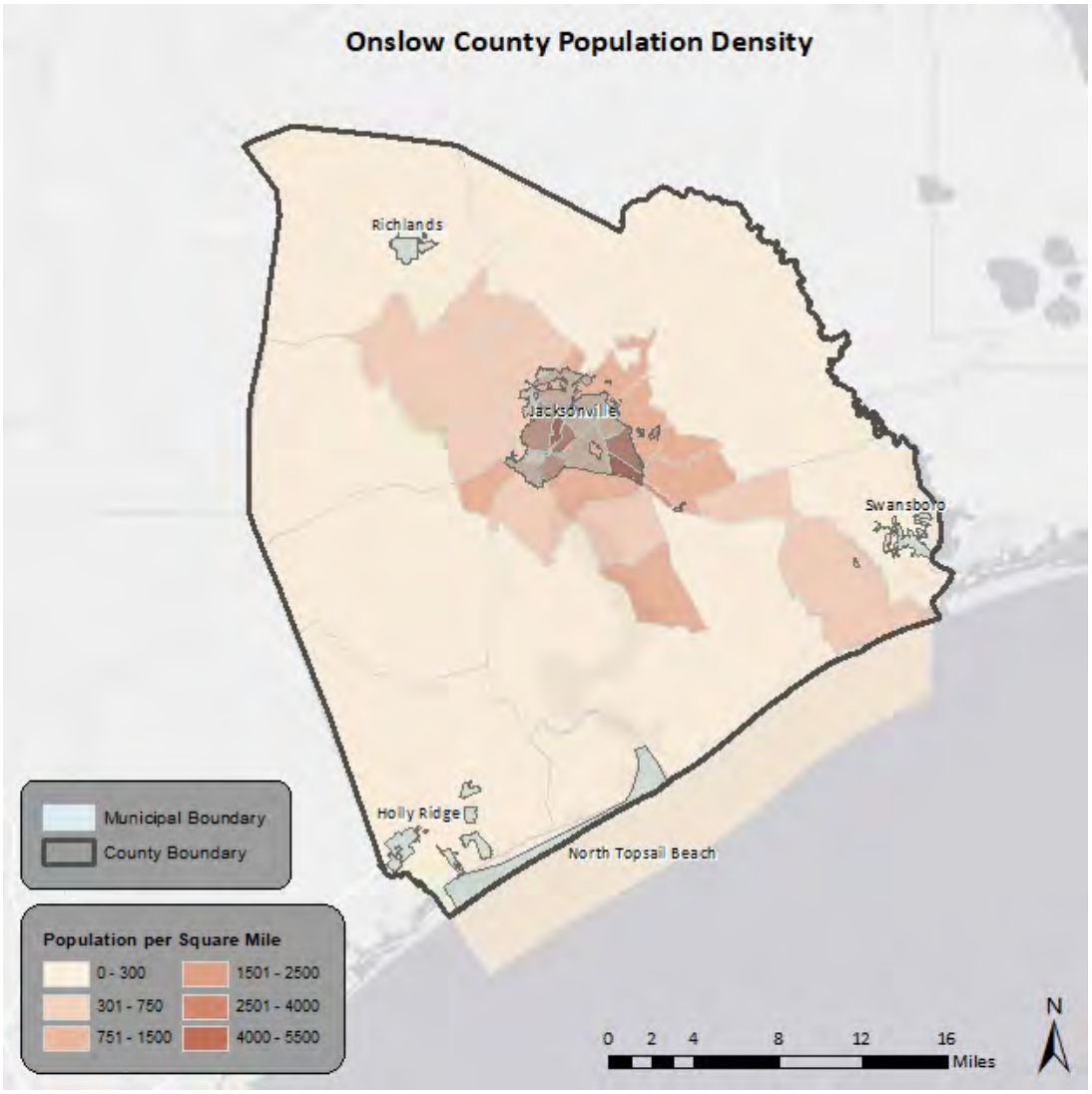
Source: US Census Bureau

FIGURE 5.34: POPULATION DENSITY IN NEW HANOVER COUNTY



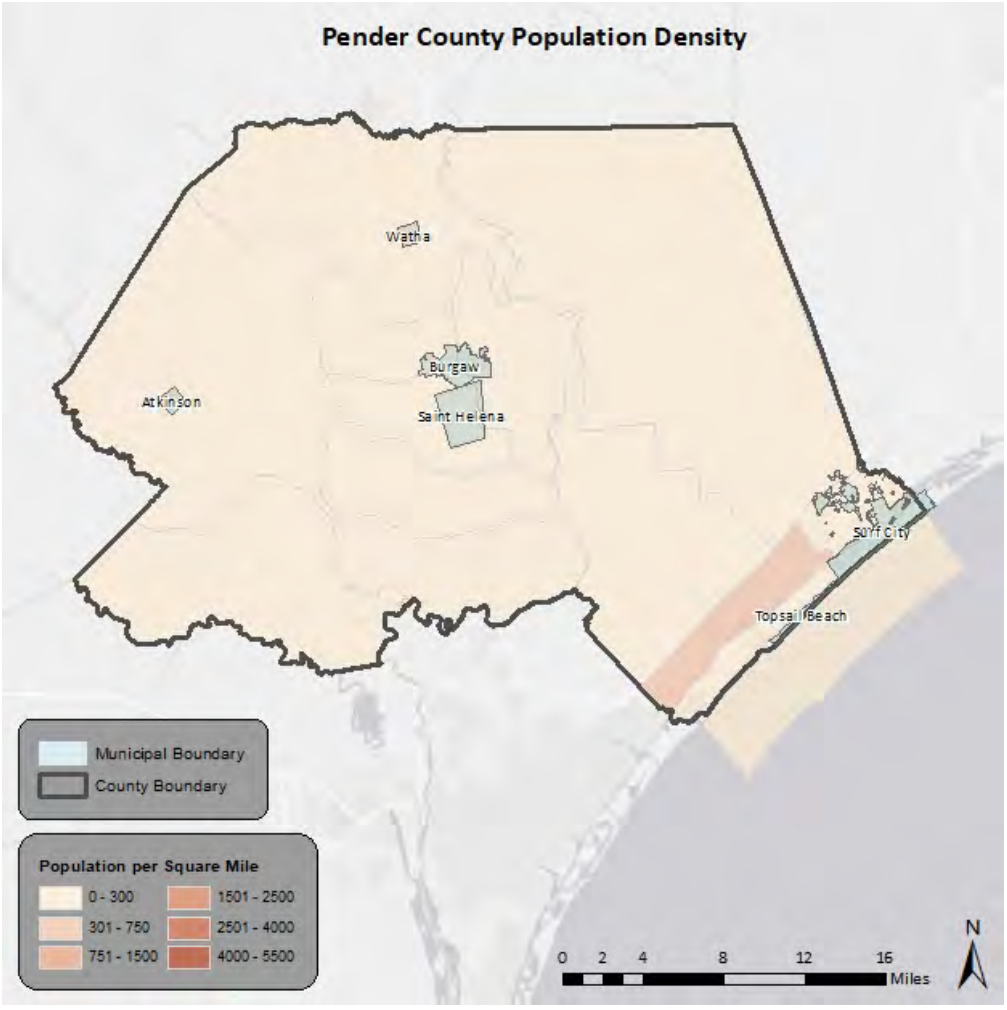
Source: US Census Bureau

FIGURE 5.35: POPULATION DENSITY IN ONSLOW COUNTY



Source: US Census Bureau

FIGURE 5.36: POPULATION DENSITY IN PENDER COUNTY



Source: US Census Bureau

The most recent population counts of each participating county and jurisdictions can be seen in **Table 5.32** below.

TABLE 5.32: 2018 POPULATION ESTIMATES FOR THE SOUTHEASTERN NC REGION

Location		2018 Population Estimates
Brunswick County		**136,744**
	Bald Head Island	175
	Belville	2,073
	Boiling Spring Lakes	6,137
	Bolivia	152
	Calabash	2,205
	Carolina Shores	4,378
	Holden Beach	644
	Leland	22,070

Location	2018 Population Estimates
Navassa	2,119
Northwest	776
Oak Island	8,072
Ocean Isle Beach	614
Sandy Creek	269
Shallotte	4,287
Southport	3,828
St. James	5,837
Sunset Beach	3,952
Varnamtown	575
Unincorporated Area	68,581
New Hanover County	**232,674**
Carolina Beach	6,354
Kure Beach	2,102
Wilmington	122,607
Wrightsville	2,542
Unincorporated Area	99,069
Onslow County	**197,683**
Holly Ridge	2,598
Jacksonville	72,896
North Topsail Beach	739
Richlands	1,676
Swansboro	3,273
Unincorporated Area	116,501
Pender County	**62,162**
Atkinson	351
Burgaw	4,140
St. Helena	425
Surf City	2,417
Topsail Beach	427
Watha	241
Unincorporated Area	54,161
Southeastern NC REGION TOTAL	**629,263**

5.17.3 Historical Occurrences

No extreme cases of terror attacks have previously affected the Southeastern NC region. However, as the population in the area continues to increase, so does the chance of an attack.

5.17.4 Probability of Future Occurrence

The probability of a future terrorist attack in the Southeastern NC Region is unlikely (between 1 and 10 percent annual probability). However, a single event could have devastating effects on human lives, the economy, and future way of life.

5.18 CYBER

5.18.1 Background and Description

Cyberattacks are deliberate attacks on information technology systems in an attempt to gain illegal access to a computer, or purposely cause damage. As the world and the Southeastern NC Region becomes more technologically advanced and dependent upon computer systems, the threat of

cyberattacks is becoming increasingly prevalent. Also known as computer network attacks, cyberattacks are difficult to recognize and typically use malicious code to alter computer data or steal information.

Mitigating and preparing for cyberattacks is challenging because of how diverse and complex attacks can be. The FBI is the lead agency for investigating cyberattacks, overseas adversaries, and terrorists. In North Carolina, the Department of Information Technology is the lead agency that maintains Cybersecurity and Risk Management resources.

Cyberattacks can happen in both the public and private sector. They may be carried out by a specific individual, or by groups from afar. Many attacks attempt to steal money or to disturb normal operations. According to the 2017 Verizon Report of Data Breaching, 93% of all data breaches had a financial or espionage motive, and espionage cases are rising.

There are many types of cyberattacks incident patterns, which include:

- Web App attacks: Incidents in which web applications were attacked, which can include exploiting code-level vulnerabilities in the application
- Point of Sale Intrusions: Remote attacks against environments where card-present retail transactions are conducted
- Miscellaneous Errors: Incidents in which unintentional actions directly compromise an attribute of a security asset
- Physical Threat and Loss: Incidents where an information asset went missing
- Crimeware: Instances involving malware that do not fit into more specific pattern
- Payment Card Skimmers: Incidents involving skimming devices physically implanted on an asset that reads magnetic stripe data from payment cards
- Cyber-espionage: Unauthorized network or system access linked to state-affiliated actors
- Denial-of-Service: Any attack intended to compromise the availability of networks and systems that are designed to overwhelm systems, resulting in performance degradation or interruption of services

Figure 5.37 below displays nationwide cyberattack incident patterns from the 2018 Verizon Data Breach Investigations Report.

FIGURE 5.37: PERCENTAGE AND COUNTS OF INCIDENTS PER PATTERN

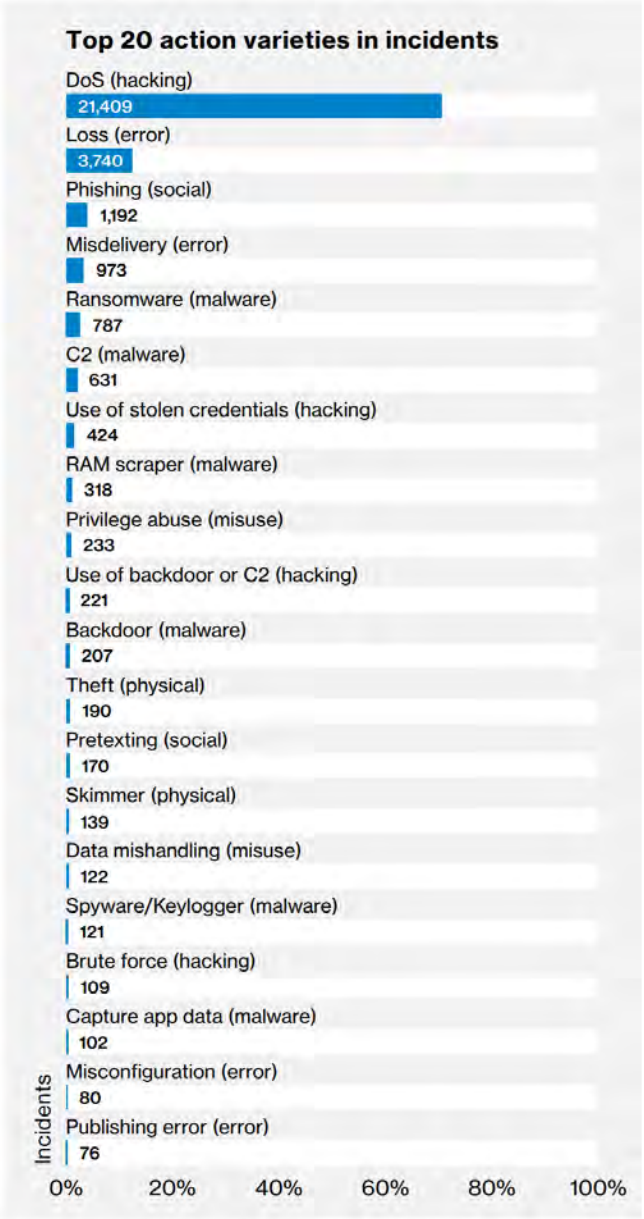


Figure 4. Top 20 threat action varieties (incidents) (n=30,362)

Source: 2018 Verizon Data Breach Investigations Report

5.18.2 Location and Spatial Extent

Cyberattacks happen all over the world and are not restricted to a certain locational boundary. They tend to affect the public industry rather than private industries.

5.18.3 Historical Occurrences

In North Carolina and the Southeastern NC Region, the Department of Information Technology specializes in cybersecurity and risk management. Within the department, the NC Information Sharing and Analysis Center gathers information on cyber threats within the State raise cybersecurity.

Table 5.33 displays the North Carolina Cybercrimes and Victim Counts in 2018.

TABLE 5.33: NORTH CAROLINA CYBERCRIMES AND VICTIM COUNTS IN 2018

Crime Type by Victim Count

Crime Type	*Victim Count*	*Crime Type*	*Victim Count*
Advanced Fee	436	Identity Theft	330
BEC/EAC	430	Investment	47
Charity	11	Lottery/Sweepstakes/Inheritance	213
Civil Matter	15	Malware/Scareware/Virus	49
Confidence Fraud/Romance	432	Misrepresentation	148
Corporate Data Breach	39	No Lead Value	246
Credit Card Fraud	306	Non-payment/Non-Delivery	1,647
Crimes Against Children	28	Other	172
Denial of Service/TDos	28	Overpayment	406
Employment	391	Personal Data Breach	1,125
Extortion	1,219	Phishing/Vishing/Smishing/Pharming	947
Gambling	4	Ransomware	29
Government Impersonation	255	Re-shipping	31
Hacktivist	2	Real Estate/Rental	286
Harassment/Threats of Violence	330	Spoofing	430
Health Care Related	9	Tech Support	361
IPR/Copyright and Counterfeit	30	Terrorism	2
Descriptors*			
Social Media	902	Virtual Currency	790

Source: FBI Internet Crime Compliant Center, 2018

Although the Southeastern NC Region have not reported any major catastrophic cyberattacks, the potential to experience one is unpredictable and can happen at any time.

5.18.4 Probability of Future Occurrences

As the world's dependency on technology grows, the possibility of experiencing cyberattacks as well. There have not been severe past occurrences in the region, and it is considered unlikely (less than 1 percent annual probability) to experience one in the near future.

5.19 ELECTROMAGNETIC PULSE

5.19.1 Background and Description

The United States Department of Energy defines electromagnetic pulses (EMPs) as "intense pulses of electromagnetic energy resulting from solar-caused effects on man-made nuclear and pulse power devices." EMPs can be naturally occurring or human-caused hazards. Examples of natural EMP events include:

- Lightning electromagnetic pulse
- Electrostatic discharge

- Meteoric electromagnetic pulse, and
- Coronal mass ejection, also known as a solar electromagnetic pulse

A human-caused EMP (such as a nuclear EMP) is a technological hazard that can cause severe damage to electrical components attached to power lines or communication systems. One of the most complex aspects of EMPs is the fact they are invisible, unpredictable, and rapid. They can also overload electronic devices that people heavily rely on every day. EMPs are harmless to people biologically; however, an EMP attack could damage electronic systems such as planes or cars. This could cause destruction of property and life and potentially generate disease or societal collapse.

In 2015, Congress amended the Homeland Security Act of 2002 by passing the Critical Infrastructure Protection Act (CIPA), which protects Americans from an EMP. It is also required reporting of EMP threats, research and development, and a campaign to educate planners and emergency responders about EMP events.

5.19.2 Location and Spatial Extent

An EMP can happen in any location, and they are relatively unpredictable. Due to advancing technologies, densely populated may be more prone to damage from an EMP. Therefore, bigger cities in the Southeastern NC Region may be more susceptible.

5.19.3 Historical Occurrences

There have been no reports of EMP occurrences in the Southeastern NC region.

5.19.4 Probability of Future Occurrences

The probability of an EMP is unlikely (less than 1 percent annual probability), but an occurrence could have catastrophic impacts.

5.20 CONCLUSIONS ON HAZARD RISK

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publications 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgement regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies and technical reports.

5.20.1 Hazard Extent

Table 5.34 describes the extent of each natural hazard identified for the Southeastern NC Region. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE 5.34 EXTENT OF SOUTHEASTERN NC REGION HAZARDS

Natural Hazards	
Drought	Drought extent is defined by the North Carolina Drought Monitor Classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought (page 5:7). According to the North Carolina Drought Monitor Classifications, the most severe drought condition experienced in the region has been Exceptional Drought. Additionally, in each of the previous 19 years (2001-2019) there has been a period of some level of drought (at least Abnormally Dry).
Excessive Heat	The extent of excessive heat can be defined by the maximum temperature reached. The highest temperature recorded in the Southeastern NC Region is 105 degrees Fahrenheit. • Brunswick County: 103°F • New Hanover County: 104°F • Onslow County: 104°F • Pender County: 105°F
Hurricane and Coastal Hazards	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.10). A total of 15 hurricanes have directly impacted the region since 1830. The greatest classification of hurricanes to traverse directly through the Southeastern NC Region was Hurricane Hazel that was a Category 4 at landfall near Calabash with winds speeds of 130 mph.
Tornadoes/ Thunderstorms	Tornadoes: Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.7) as well as the Fujita/Enhanced Fujita Scale (Tables 5.13 and 5.14). The greatest magnitude reported was an F2 (last reported on June 13, 1962). • Brunswick County: F2 • New Hanover County: F1 • Onslow County: F3 • Pender County: F2 Thunderstorms: Thunderstorm extent is defined by the number of thunder events and wind speeds reported. According to a 63-year history from the National Centers for Environmental Information, the strongest recorded wind event in the Southeastern NC Region was reported on June 12, 1995 at 98 knots (approximately 112 mph). It should be noted that future events may exceed these historical occurrences. • Brunswick County: 98 knots • New Hanover County: 87 knots • Onslow County: 78 knots • Pender County: 83 knots Lightning: According to the Vaisala flash density map (Figure 5.8), the majority of the Southeastern NC Region is located in an area that experiences 4 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures. Hailstorms: Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the Southeastern NC region was 2.75 inches (reported April 21, 1997. It should be noted that future events may exceed this. • Brunswick County: 2 in • New Hanover County: 2.5 in • Onslow County: 2.75 in • Pender County: 1.75 in
Severe Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the region was 20 inches on March 3, 1980. Extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not available.

<table>
<tr><td></td><td>• Brunswick County: 15 in
• New Hanover County: 11.1 in
• Onslow County: 20 in
• Pender County: 12 in</td></tr>
<tr><td>Earthquakes</td><td>Earthquake extent can be measured by the Richter Scale (Table 5.20) and the Modified Mercalli Intensity (MMI) scale (Table 5.21) and the distance of the epicenter from the Southeastern NC Region. According to data provided by the National Geophysical Data Center, the greatest MMI to impact the region was reported on September 1, 1886 with a MMI of V (moderate) with a correlating Richter Scale measurement of approximately 4.8.
• Brunswick County: IV
• New Hanover County: V
• Onslow County: V
• Pender County: IV</td></tr>
<tr><td>Geological</td><td>Sinkhole: Sinkhole extent can be measured by the width and depth of the sinkhole. According to the NC State Enhanced Hazard Mitigation Plan, the greatest extent for a sinkhole in the region is 25 feet.
Coastal Erosion: The extent of erosion can be defined by the measurable rate of erosion that occurs. According to the NC State Enhanced Hazard Mitigation Plan, the average extent for coastal erosion is 1.6 ft per year.</td></tr>
<tr><td>Dam Failure</td><td>Dam failure extent is defined using the North Carolina Division of Land Resources criteria (Table 5.24). Of the 29 dams in Southeastern NC Region, 9 are classified as high-hazard.
• Brunswick County: 4
• New Hanover County: 2
• Onslow County: 0
• Pender County: 3</td></tr>
<tr><td>Flooding</td><td>Flood extent can be measured by flood depth and velocity.
Flood depth and velocity are recorded via United States Geological Survey stream gauges throughout the region. While a gauge does not exist for each participating jurisdiction, there is one at or near many areas. The greatest peak discharge recorded for the region was reported on October 13, 2005. Water reached a discharge of 6,830 cubic feet per second, but stream gauge height data was not available. Additional peak discharge readings and gauge heights are in the table below.

<table>
<tr><th>Location/ Jurisdiction</th><th>Date</th><th>Peak Discharge (cfs)</th><th>Gauge Height (ft)</th></tr>
<tr><td colspan="4">Brunswick County</td></tr>
<tr><td>Waccamaw River at Freeland</td><td>2/23/1940</td><td>1,910</td><td>13.15</td></tr>
<tr><td colspan="4">New Hanover</td></tr>
<tr><td>n/a</td><td>~</td><td>~</td><td>~</td></tr>
<tr><td colspan="4">Onslow County</td></tr>
<tr><td>New River Near Gum Branch</td><td>1908</td><td>~</td><td>18</td></tr>
<tr><td colspan="4">Pender County</td></tr>
<tr><td>Northeast Cape Fear Rd near Burgaw</td><td>10/13/2005</td><td>6,830</td><td>~</td></tr>
</table>
</td></tr>
</table>

	Depth of flooding inside structures across the region during a maximum flood event ranges from 1-3 feet and varies based on the structure's location in the floodplain and the elevation of the structure.
Other Hazards	
Wildfires	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county. Analyzing the data by county indicates the following wildfire hazard extent for each county. ***Brunswick County*** • The greatest number of fires to occur in any year was 69 in 2007. • The greatest number of acres to burn in a single year occurred in 2016 when 1,577.65 acres were burned. ***New Hanover County*** • The greatest number of fires to occur in any year was 79 in 2007. • The greatest number of acres to burn in a single year occurred in 2005 when 1,154 acres were burned. ***Onslow County*** • The greatest number of fires to occur in any year was 63 in 2011. • The greatest number of acres to burn in a single year occurred in 2011 when 944 acres were burned. ***Pender County*** • The greatest number of fires to occur in any year was 59 in 2004. • The greatest number of acres to burn in a single year occurred in 2011 when 31,140 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the region.
Infectious Disease	Infectious disease extent can be measure by how many lives are taken as a result of the event and how many economic dollar losses are caused by the disease. While dollar losses are difficult to capture, lives lost are not. The COVID-19 pandemic continues to unfolding and is shaping up to be the deadliest and costliest infectious disease outbreak to impact the region.
Technological Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the region was 40,000 SLB of Ammonium Nitrate released from a train car on November 1, 1984. It should be noted that larger events are possible. • Brunswick County: 1,175 LGA • New Hanover County: 54,969 LGA • Onslow County: 3250 LGA • Pender County: 0 LGA
Radiological Emergency – Fixed Nuclear Facilities	Although there is no history of a nuclear accident at the Brunswick Nuclear Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at Brunswick is possible.
Terrorism	Although no severe terrorism attacks have been reported in the Southeastern NC region, the entire area is still at risk to a future event. Densely populated areas, such as cities, are considered more susceptible. Terror events have the potential to affect the human population, buildings and infrastructure, and the economy in the region.
Cyber	No cyber-attacks have been historically reported in the Southeastern NC region. Technology usage, however, is increasing. A cyber-attack could potentially devastate the region's economy and could have lasting negative impacts.

Electromagnetic Pulse	Electromagnetic Pulse (EMP) occurrences have not taken place in the Southeastern NC region, but the risk still exists. If an EMP were to occur, the effects would negatively impact first responders and communication efforts and may cause panic within the area.

5.20.2 Priority Risk Index

In order to draw some meaningful planning conclusions on hazard risk for the Southeastern NC Region, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). The purpose of the PRI is to categorize and prioritize all potential hazards for the Southeastern NC Region as high, moderate, or low risk. Combined with the asset inventory and quantitative vulnerability assessment provided in the next section, the summary hazard classification generated through the use of the PRI allows for the prioritization of those high hazard risks for mitigation planning purposes, and more specifically, the identification of hazard mitigation opportunities for the Southeastern NC Region to consider as part of their proposed mitigation strategy.

The prioritization and categorization of identified hazards for the Southeastern NC Region is based principally on the PRI, a tool used to measure the degree of risk for identified hazards in a particular planning area. The PRI is used to assist the Southeastern NC Regional Hazard Mitigation Planning Committee (TRRHMPC) in gaining consensus on the determination of those hazards that pose the most significant to the Southeastern NC counties based on a variety of factors. The PRI is not scientifically based, but is rather meant to be utilized as an objective planning tool for classifying and prioritizing hazard risks in the Southeastern NC Region based on standardized criteria.

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed upon weighting factor[24], as summarized in **Table 5.35**. To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

PRI VALUE = [(PROBABILITY x .30) + (IMPACT x .30) (SPATIAL EXTENT x .20) + (WARNING TIME x .10) + (DURATION x .10)]

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. When the scheme is applied for the Southeastern NC Region, the highest PRI value is 3.5 (flooding hazard). Prior to being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the Southeastern NC Regional Planning Committee.

[24] The Regional Hazard Mitigation Planning Committee: based on upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates

TABLE 5.35: PRIORITY RISK INDEX FOR THE SOUTHEASTERN NC REGION

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	**30%**
	Possible	Between 1% and 10% annual probability	2	
	Likely	Between 10 and 100% annual probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	**30%**
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	**20%**
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self-explanatory	1	**10%**
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	**10%**
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

5.20.3 Priority Risk Index Results

Table 5.36 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the Planning Committee. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE 5. 36: SUMMARY OF PRI RESULTS FOR THE SOUTHEASTERN NC REGION

Hazard	Subhazard(s) Assessed	Category/Degree of Risk					
		Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Natural Hazards							
Drought		Likely	Minor	Small	More than 24 hours	More than 1 week	2.1
Excessive Heat		Likely	Minor	Large	More than 24 hours	Less than 1 week	2.5
Hurricane and Coastal Hazards		Likely	Critical	Large	More than 24 hours	Less than 1 week	3
Hurricanes and Coastal Hazards	Rip Currents						
Tornadoes/ Thunderstorms	Hailstorm, Lightning	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	2.8
Severe Winter Weather		Possible	Limited	Large	More than 24 hours	Less than 1 week	2.4
Earthquakes		Unlikely	Minor	Moderate	Less than 6 hours	Less than 6 hours	2
Geological Hazards	Sinkholes	Likely	Limited	Small	Less than 6 hours	Less than 6 hours	2.1
Geological Hazards	Coastal Erosion	Highly Likely	Minor	Negligible	More than 24 hours	More than 1 week	2.2
Dam Failure		Unlikely	Limited	Negligible	Less than 6 hours	Less than 24 hours	1.7
Flooding		High Likely	Critical	Moderate	6 to 12 hours	Less than 1 week	3.3
Tsunamis		Unlikely	Limited	Small	Less than 6 hours	More than 1 week	2
Other Hazards							
Wildfires		Likely	Minor	Small	12 to 24 hours	Less than 1 week	2.1
Infectious Disease		Unlikely	Critical	Moderate	Less than 6 hours	More than 1 week	2.3
Technological Hazards							
Hazardous Substances		Possible	Limited	Small	Less than 6 hours	Less than 24 hours	2.2
Radiological Emergency	Fixed Nuclear Facilities	Unlikely	Critical	Large	6 to 12 hours	Less than 1 week	2.6
Terrorism		Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	2.2
Cyber		Possible	Critical	Large	Less than 6 hours	Less than 1 week	3

Hazard	Subhazard(s) Assessed	Category/Degree of Risk					
		Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Electromagnetic Pulse		Unlikely	Minor	Large	12 to 24 hours	Less than 6 hours	1.7

5.21 FINAL DETERMINATIONS

The conclusions drawn from the hazard profiling process for the Southeastern NC Region, including PRI results and input from the Regional Hazard Mitigation Planning Committee, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table 5.37**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the Southeastern NC Region. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment*.

Table 5.37 ranks the hazards that were assessed in the update that were renamed to be consistent with the State of North Carolina Hazard Mitigation Plan. These conclusions were based on the PRI calculations and input from the Southeastern NC Regional Planning Committee.

TABLE 5.37: 2020 CONCLUSIONS ON HAZARD RISK FOR THE SOUTHEASTERN NC REGION

HIGH RISK	Flooding Hurricanes/Coastal Hazards Cyber Tornadoes/Thunderstorms
MODERATE RISK	Severe Winter Weather Radiological Emergency Infectious Disease Hazardous Substances Drought Terrorism Wildfire Geological Hazards (Sinkholes, Coastal Erosion) Rip Currents
LOW RISK	Tsunamis Excessive Heat Earthquake Dam Failure Electromagnetic Pulse

SECTION 6
VULNERABILITY ASSESSMENT

This section identifies and quantifies the vulnerability of the jurisdictions within the Southeastern NC Region to the significant hazards identified in the previous sections (*Hazard Identification and Profiles*). It consists of the following subsections:

- 6.1 Overview
- 6.2 Methodology
- 6.3 Explanation of Data Sources
- 6.4 Asset Inventory
- 6.5 Vulnerability Assessment Results
- 6.6 Conclusions on Hazard Vulnerability

44 CFR Requirement

44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of: (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

6.1 OVERVIEW

This section builds upon the information provided in Section 4: *Hazard Identification* and Section 5: *Hazard Profiles* by identifying and characterizing an inventory of assets in the Southeastern NC Region. Additionally, an assessment is conducted for each identified hazard, where feasible, including the potential impact and expected amount of damages it may cause. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimates for each hazard. In doing so, each county and their participating jurisdictions may better understand their unique risks to identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions.

This section begins with an explanation of the methodology applied to complete the vulnerability assessment, followed by a summary description of the asset inventory as compiled for jurisdictions in the Southeastern NC Region. The remainder of this section focuses on the results of the assessment conducted.

For the dam failure[1], drought, excessive heat, infectious disease, radiological emergency, terrorism, cyber, and EMP, there was insufficient data available to conduct meaningful estimates of property damages. Therefore, a detailed vulnerability assessment could not be completed for these hazards at this time. Future updates of this plan should attempt to better quantify vulnerability for these hazards as better data is developed.

6.2 METHODOLOGY

This vulnerability assessment was conducted using two distinct methodologies: (1) a geographic information system (GIS)-based analysis; and (2) a risk modeling software analysis with results pulled from NCEM's Risk Management Tool (RMT). Each approach provides estimates for the potential impact of hazards. A brief description of the two different approaches is provided on the following pages.

6.2.1 GIS-Based Analysis

Hazards that have specified geographic boundaries permit vulnerability analysis to be conducted using Geographic Information Systems (GIS). These hazards include:

- Flooding
- Geological (Sinkholes and Coastal Erosion)
- Wildfires
- Hazardous Substances

The objective of the GIS-based analysis is to determine the estimated vulnerability of buildings, critical facilities and populations for the identified hazards in the Southeastern NC Region using best available geospatial data. Digital data was collected from local, regional, state, and national sources for hazards and buildings. This included local tax assessor records for individual parcels and buildings and georeferenced point locations for identified assets (critical facilities and infrastructure, special populations, etc.) when available. ESRI® ArcGIS™ 10.6.1 was used to assess hazard vulnerability utilizing digital hazard data, as well as local building data. Using these data layers, hazard vulnerability can be quantified by estimating the assessed building value for parcels and/or buildings determined to be located in identified hazards areas. To estimate vulnerable populations in hazard areas digital Census 2010 data by census tract was obtained and was supplemented with current population estimates from the US Census Bureau. This was intersected with hazard areas to determine exposed population counts. The results of the analysis provided an estimate of the number of people and critical facilities, as well as the assessed value of parcels and improvements, determined to be potentially at risk to those hazards with delineable geographic hazard boundaries.

6.2.3 Risk Management Tool

The Risk Management Tool (RMT) was developed by NCEM-Risk Management (RM) as a tool to simplify hazard mitigation plan development into a single, automated, tool-based format to include geospatially based risk assessment data, also developed by NCEM-RM. The RMT is a twofold system used to create and/or update a local and state hazard mitigation plan. The two parts of the RMT are step-by-step system that will prompt a user to input information and narrative as well as upload pictures, documents,

[1] As noted in Section 5: *Hazard Profiles*, dam failure could be catastrophic to structures and populations in the inundation area. However, due to lack of data, no additional analysis was performed. Further, USACE and NCDEQ also complete separate dam failure plans to identify risk and response measures.

and other information as needed. The second part of the system is the Risk Tool. The Risk Tool will run a risk assessment at the building level for certain hazards selected based on predetermined calculations for each hazard. Some hazards will have a single return period and others have multi-return periods. The availability of multi-returns periods is based on the availability of datasets for each hazard and the degree of detail in each dataset.

The Risk Assessment produced by the Risk Tool will also identify high-risk structures in the planning area and estimate cost by types of mitigation projects (wind retrofits, elevation, acquisition, mitigation reconstruction) and benefit-cost estimates by type of mitigation. The mitigation tool is only meant to begin the process of thinking about problem areas where mitigation may be of interest to the jurisdiction and property owners. It is also designed to drive mitigation actions that are specific, measurable, attainable, realistic, and timely.

Finally, the Risk Management Tool also identifies vulnerable populations, such as children and elderly persons. Data used to assess these populations is the US 2010 Census. According to the US Census Bureau, those defined as "elderly," area 65 years old or older, while those defined as "children" are 5 years old or younger. It is important to note that the numbers assessed are from the most recent Census in 2010.

Once all of the information is input into the system, a hazard mitigation plan can then be exported into multiple document formats. The system will also store the plan so that when it is time to update the plan, the information is already in the system.

The RMT was originally developed as part of the Integrated Hazard Risk Management (IHRM) pilot project which included Durham, Edgecombe, Macon, and New Hanover counties. The pilot was successful and it was determined that there is a need and interest in a system designed to be used statewide and potentially nationwide in the future. The RMT used in this update was the second version created by NCEM.

A list of the hazards assessed by the RMT follows:

- Hurricane and Coastal Hazards
- Tornadoes/Thunderstorms
- Earthquakes
- Flooding
- Wildfires

All conclusions are presented in "**Conclusions on Hazard Vulnerability**" at the end of this section.

6.3 EXPLANATION OF DATA SOURCES

Hurricanes

NCEM's Risk Management Tool assessed vulnerable areas to the Hurricanes. For this assessment, vulnerable buildings and populations were analyzed against damages caused by hurricane winds.

Tornadoes/Thunderstorms

NCEM's Risk Management Tool analyzed the vulnerable buildings and populations to the Tornadoes/Thunderstorms hazard. Sub hazards assessed under the thunderstorm's hazards include hail

and lightning; however, for the purposes of this assessment, thunderstorm winds were the only risk analyzed.

Earthquakes
NCEM's Risk management Tool assessed vulnerable areas to the earthquake hazard. This assessment included susceptible buildings by the type of structure, and the potential dollar losses associated with the buildings. It also analyzed susceptible populations, such as children and elderly.

Geological (Sinkholes and Coastal Erosion)
Vulnerability assessment results for sinkholes and coastal erosion were pulled from the NC State Enhanced Hazard Mitigation Plan.

Flooding
FEMA Digital Flood Insurance Rate Maps (DFIRMs) were used to determine flood vulnerability. DFRIM data can be used in ArcGIS for mapping purposes and, they identify several features including floodplain boundaries and base flood elevations. Identified areas on the DFRIM represent some features of a Flood Insurance Rate Maps including the 100-year flood areas (1.0 percent annual chance flood), and the 500-year flood areas (0.2 percent annual chance flood). To determine vulnerability, local parcel data and critical facilities were overlaid on the 100-year floodplain areas and 500-year floodplain areas. This data was also supplemented with the NCEM RMT data, which assessed structure type and vulnerable populations within the floodplain areas. It should be noted that such an analysis does account for building elevation.

Wildfires
The data used to determine vulnerability to wildfires in the Southeastern NC Region is based on a GIS analysis called the Southern Wildfire Risk Assessment (SWRA). It was provided for use in this plan by the North Carolina Division of Forest Resources. A specific layer known as the "Wildland Urban Interface" (WUI) was used to determine vulnerability of people and property. This layer uses the key input of housing density to define potential wildfire impacts to people and homes. The WUI Risk Index is then derived from a scale of -1 to -9, with the least negative impact being a -1. The primary purpose of this data is to highlight areas of concern that may be conducive of mitigation actions. Many assumptions area made, making it not a true probability; however, it does provide a comparison of risk throughout the region. Data was also supplemented with the data NCEM's RMT, which assessed vulnerable buildings, potential dollar losses of those buildings, and susceptible populations.

Hazardous Substances
Hazardous materials incidents can occur in both fixed facilities and through mobile transportation. For each fixed incident analysis, Toxic Release Inventory (TRI) data was used. The Toxic Release Inventory is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemicals, releases, and other waste management activities reported annually by certain covered industry groups, as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA) and was further expanded by the Pollution Prevention Act of 1990. Facilities that meet certain activity thresholds must annually report their releases and other waste management activities for listed toxic chemicals to the EPA and to their state or tribal entity. A facility must report if it meets the following criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services;
- Has 10 or more full-time employee equivalents; and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative, and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds, or 0.1 grams depending on the chemical.

For the mobile hazardous materials incident analysis, transportation data including major highways and railroads were obtained from the North Carolina Department of Transportation. This data is ArcGIS compatible, lending itself to buffer analysis to determine risk.

6.4 ASSET INVENTORY

An inventory of geo-referenced assets within Brunswick, New Hanover, Pender, and Onslow counties and jurisdictions was compiled in order to identify and characterize those properties potentially at risk to the identified hazards[2]. By understanding they type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of physical assets were created and then further assessed through GIS analysis. Additionally, social assets are addressed to determine population at risk to the identified hazards. These are presented below in Section 6.4.2.

6.4.1 Physical and Improved Assets

The two categories of physical assets consist of:

- **Improved Property:** Includes all improved properties in the Southeastern NC Region according to local parcel data provided by the counties. The information has been expressed in terms of the number of parcels and total assessed value of improvements (buildings) that may be exposed to the identified hazards.
- **Critical Facilities:** Critical facilities vary by jurisdiction. Each county provided data from their respective critical facilities that were used in this section. Identified critical facilities are fire stations, police stations, medical care facilities, schools, government facilities, emergency operation centers, or other important buildings. It should be noted that this listing is not all-inclusive for assets located in the region, but it is anticipated that it will be expanded during future plan updates as more geo-referenced data becomes available for use in GIS analysis.

The following table provide a detailed listing of the geo-referenced assets that have been identified for inclusion in the vulnerability assessment for the Southeastern NC Region.

[2] While potentially not all-inclusive for the jurisdictions in the Southeastern NC Region, “georeferenced” assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

Table 6.1 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for participating areas of the Southeastern NC Region (study area of vulnerability assessment)[3].

TABLE 6.1: IMPROVED PROPERTY IN THE SOUTHEASTERN NC REGION

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Assessed Value of Improvements
Brunswick County	**141,581**	**$9,914,013,665**	**83,090**	**$14,979,238,057**
Bald Head Island	2,368	$472,828,580	1,165	$621,138,490
Belville	889	$61,104,130	782	$132,514,260
Boiling Spring Lakes	8,966	$129,566,760	2,772	$399,791,700
Bolivia	118	$3,830,650	76	$15,699,590
Calabash	2,214	$103,618,500	1,300	$147,009,570
Carolina Shores	3,122	$78,754,950	2,545	$401,250,750
Holden Beach	2,732	$475,890,200	2,060	$466,548,168
Leland	12,329	$675,396,610	8,799	$1,809,693,775
Navassa	983	$36,904,640	593	$60,438,560
Northwest	618	$12,967,700	300	$20,919,140
Oak Island	11,405	$1,267,805,080	8,930	$1,494,298,009
Ocean Isle Beach	3,409	$868,510,560	2,490	$707,017,096
Sandy Creek	135	$2,976,870	98	$7,744,860
Shallotte	2,850	$167,201,510	1,598	$412,827,820
Southport	2,953	$347,431,460	2,072	$512,287,830
St. James	4,744	$400,303,100	3,122	$1,134,425,840
Sunset Beach	4,779	$524,451,660	3,821	$785,631,384
Varnamtown	473	$15,157,480	305	$34,870,350
Unincorporated Area	76,494	$4,269,313,225	40,262	$5,815,130,865
New Hanover County	**96,803**	**$11,393,561,127**	**82,043**	**$19,275,321,477**
Carolina Beach	3,874	$472,809,228	2,983	$581,952,993
Kure Beach	2,065	$352,118,500	1,667	$360,437,300
Wilmington	41,499	$4,300,204,763	36,216	$9,801,637,609
Wrightsville	1,883	$1,366,421,200	1,544	$488,540,800
Unincorporated Area	47,482	$4,902,007,436	39,633	$8,042,752,775
Onslow County	**79,999**	**$4,796,243,010**	**60,982**	**$8,000,111,546**
Holly Ridge	2,988	$95,530,860	1,611	$224,483,194
Jacksonville	15,573	$1,222,451,621	14,180	$2,332,842,890
North Topsail Beach	3,666	$354,768,730	2,653	$464,623,395
Richlands	1,003	$43,865,020	833	$104,342,078
Swansboro	1,636	$143,742,830	1,465	$205,831,048
Unincorporated Area	55,133	$2,935,883,949	40,240	$4,667,988,941
Pender County	**49,277**	**$4,243,758,251**	**30,234**	**$3,946,369,985**
Atkinson	325	$5,247,643	184	$11,518,718
Burgaw	1,916	$90,332,977	1,302	$237,162,974

[3] Total assessed value for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

St. Helena	352	$19,229,188	196	$19,903,173
Surf City	5,225	$807,441,855	4,204	$640,094,568
Topsail Beach	1,852	$461,842,066	1,505	$255,021,882
Watha	161	$3,352,558	93	$5,684,181
Unincorporated Area	39,446	$2,856,311,964	22,750	$2,776,984,489
Southeastern NC Regional Total	**367,660**	**$30,347,576,053**	**256,349**	**$46,201,041,065**

Source: Local Governments

The following table lists the fire stations, police stations, emergency operations centers (EOCs), medical care facilities, schools, and other critical facilities in the Southeastern NC Region. Local governments at the county level provided a majority of the data for this analysis. In addition, **Figure 6.1** shows the locations of essential facilities in the Southeastern NC Region. **Table 6.26**, at the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all inclusive and only includes information provided by the counties.

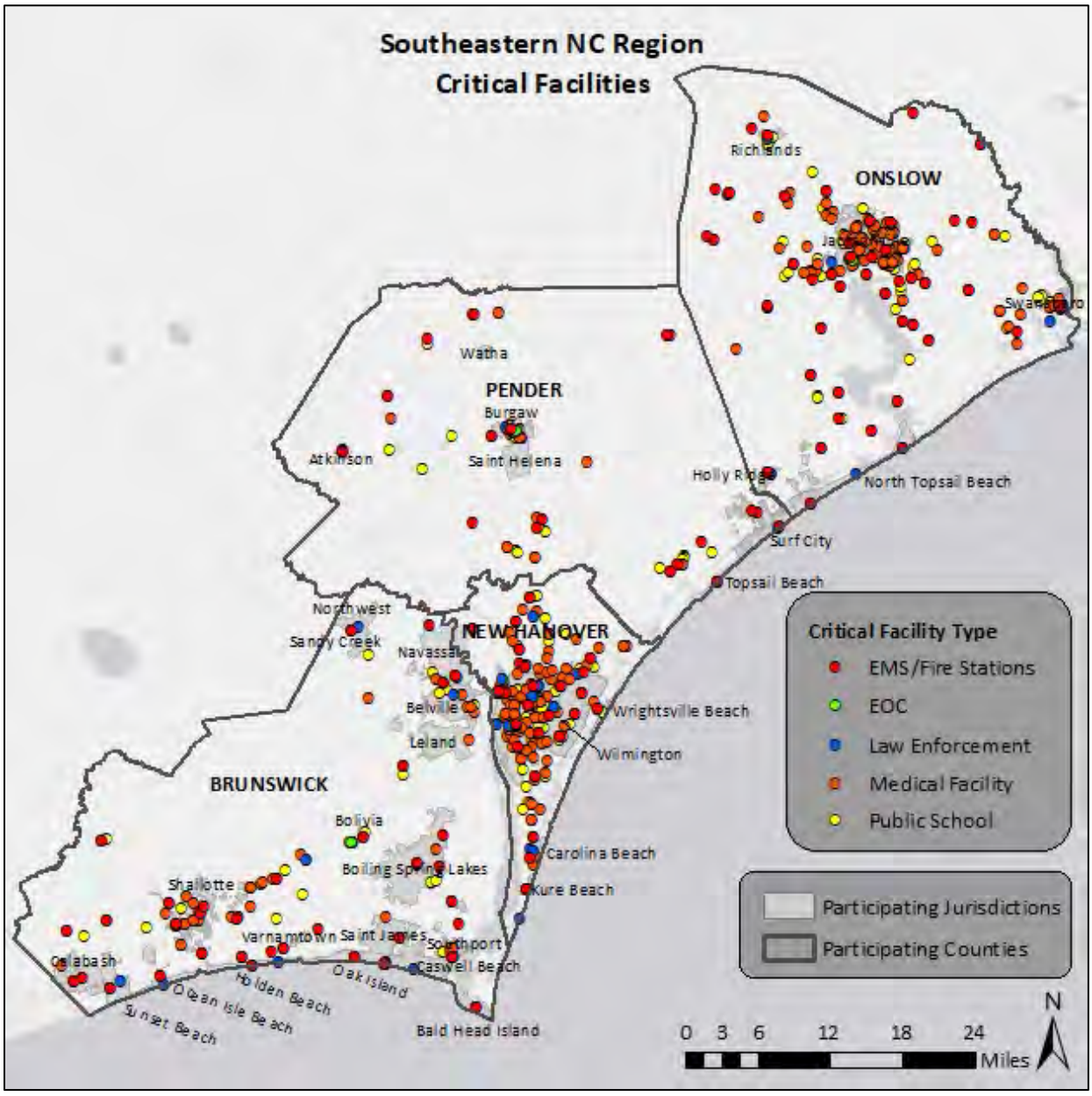
TABLE 6.2: CRITICAL FACILITY INVENTORY IN THE SOUTHEASTERN NC REGION

Location	Fire/EMS Stations	Police Stations	Medical Care Facilities	Schools	Other
Brunswick County	**63**	**14**	**37**	**20**	**1**
Bald Head Island	2	1	0	0	0
Belville	0	0	2	0	0
Boiling Spring Lakes	4	1	1	2	0
Bolivia	2	0	0	1	0
Calabash	3	0	0	0	0
Carolina Shores	0	0	0	0	0
Holden Beach	2	1	0	0	0
Leland	2	1	2	2	0
Navassa	2	1	0	0	0
Northwest	2	1	0	0	0
Oak Island	5	1	0	0	0
Ocean Isle Beach	2	1	0	0	0
Sandy Creek	0	0	0	0	0
Shallotte	8	1	4	2	0
Southport	2	1	2	2	0
St. James	2	0	0	0	0
Sunset Beach	2	1	0	0	0
Varnamtown	0	0	0	0	0
Unincorporated Area	23	3	26	11	1
New Hanover County	**46**	**19**	**136**	**44**	**1**
Carolina Beach	1	1	2	1	0
Kure Beach	2	1	0	0	0
Wilmington	23	12	103	26	1
Wrightsville	2	1	0	1	0
Unincorporated Area	18	4	31	16	0
Onslow County	**49**	**9**	**72**	**43**	**1**
Holly Ridge	2	1	1	0	0
Jacksonville	7	3	43	10	1
North Topsail Beach	2	1	0	0	0
Richlands	2	1	1	4	0
Swansboro	2	1	5	1	0
Unincorporated Area	34	2	23	28	0

Location	Fire/EMS Stations	Police Stations	Medical Care Facilities	Schools	Other
Pender County	**27**	**5**	**29**	**16**	**2**
Atkinson	2	0	2	0	0
Burgaw	2	3	16	3	2
St. Helena	0	0	0	0	0
Surf City	2	1	0	0	0
Topsail Beach	3	1	0	0	0
Watha	0	0	0	0	0
Unincorporated Area	18	0	11	13	0
Southeastern NC Regional Total	**185**	**47**	**274**	**123**	**5**

Source: Local Governments

FIGURE 6.1: CRITICAL FACILITIES IN THE SOUTHEASTERN NC REGION



6.4.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the Southeastern NC Region that are potentially at risk to these hazards.

Table 6.3 lists the population by county according to U.S. Census 2010 population estimates. The population estimates are updated using the most recent vintage tables dated July 1, 2018. The total population in the Southeastern NC Region according to Census data is 628,863.

TABLE 6.3: TOTAL POPULATION IN THE SOUTHEASTERN NC REGION

Location	2018 Population Estimates
Brunswick County	136,744
New Hanover County	232,274
Onslow County	197,683
Pender County	62,162
Southeastern NC Regional Total	**628,863**

Source: US Census Bureau

Additional population estimates are presented in Section 3: *Community Profile*.

In addition, **Figure 6.2-6.5** illustrate the population density by census tract for each county, as it was reported by the U.S. Census Bureau in 2010 and updated with 2017 population estimates.

FIGURE 6.2: POPULATION DENSITY IN BRUNSWICK COUNTY

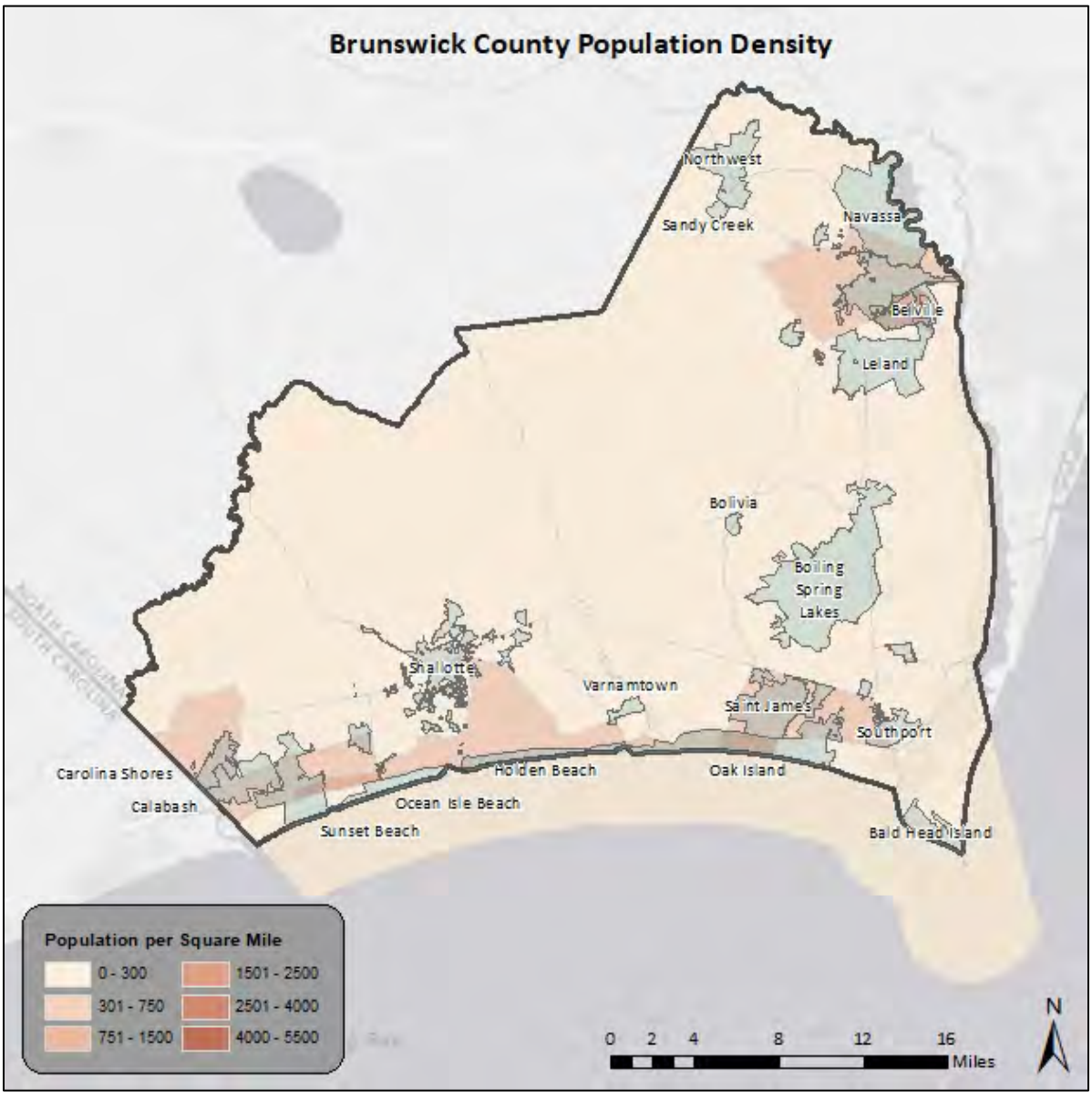


FIGURE 6.3: POPULATION DENSITY IN NEW HANOVER COUNTY

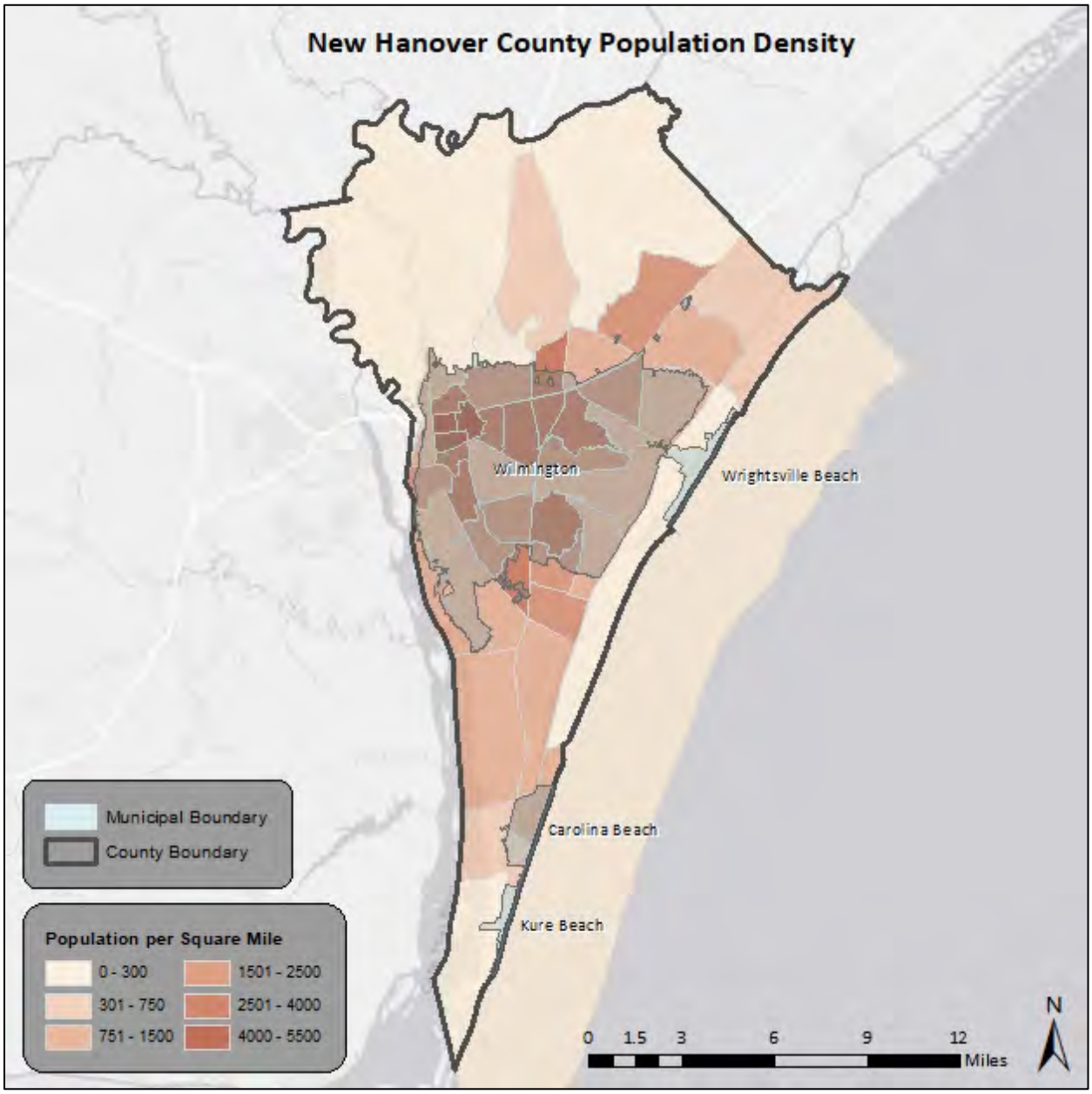


FIGURE 6.4: POPULATION DENSITY IN ONSLOW COUNTY

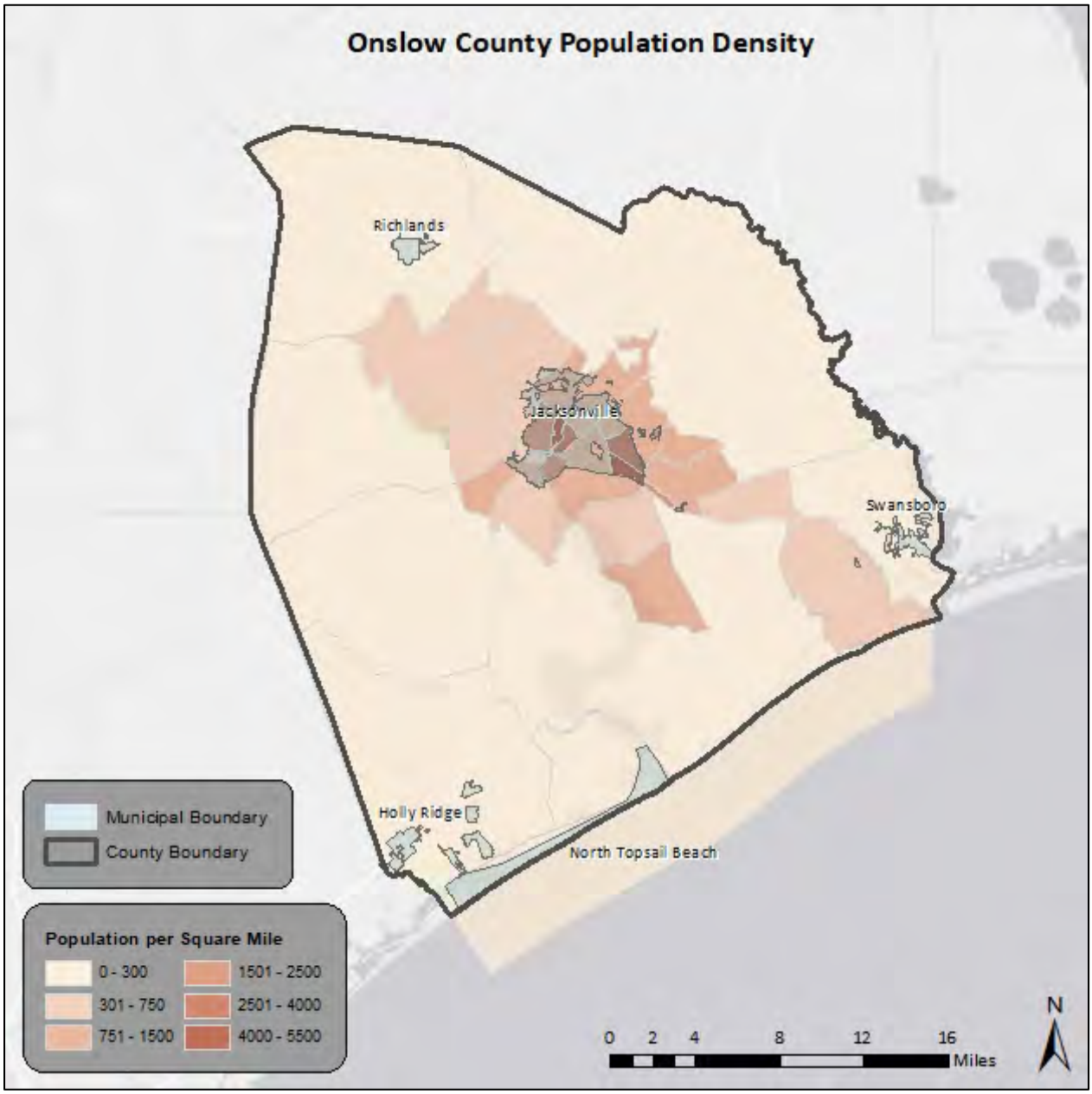
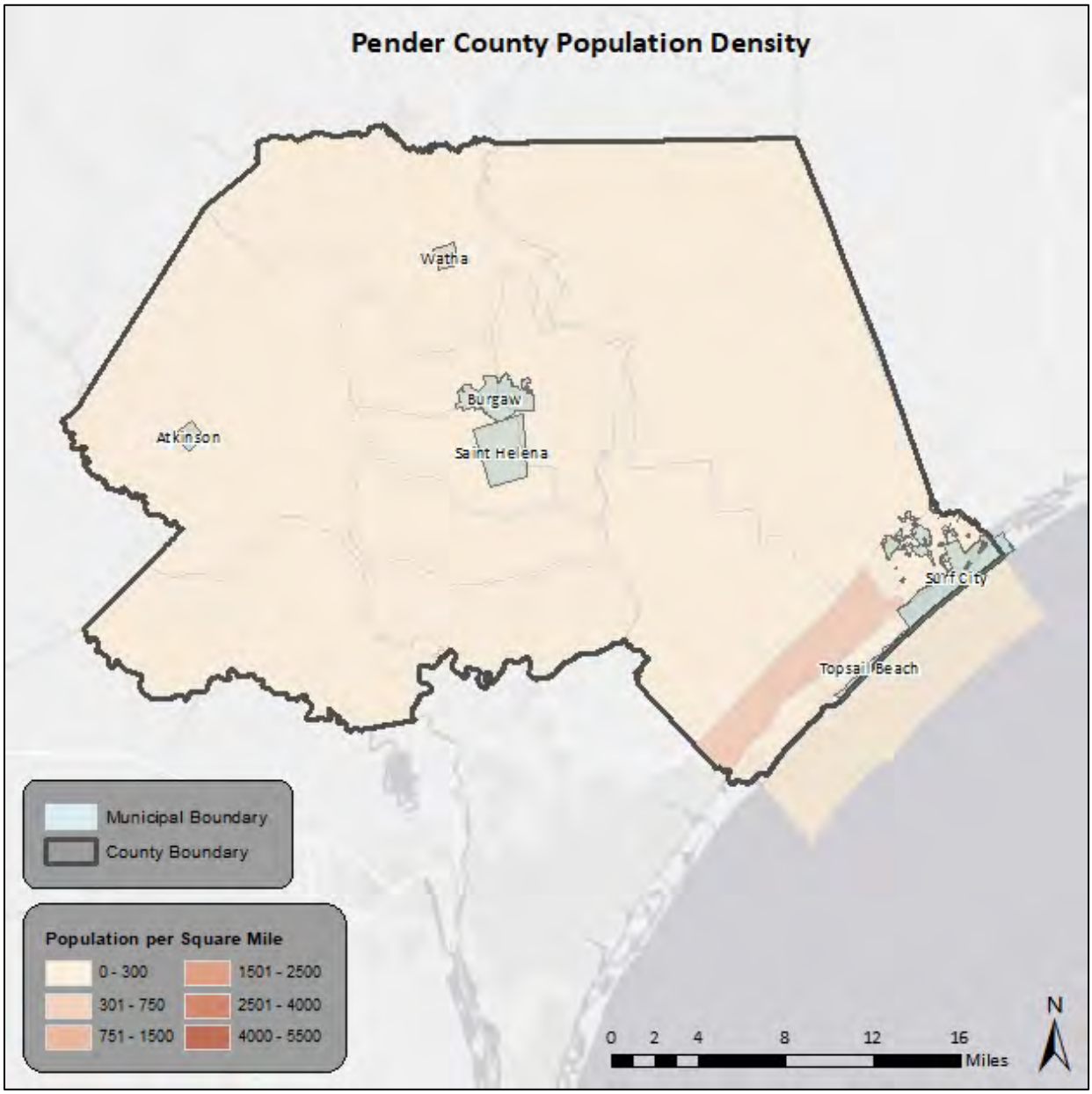


FIGURE 6.5: POPULATION DENSITY IN PENDER COUNTY



6.4.3. Development Trends and Changes in Vulnerability

Since the previous regional hazard mitigation plan was approved (in 2016), the Southeastern NC Region has experienced strong growth and development. **Table 6.4** shows the number of building units constructed since 2010 according to the US Census American Community Survey.

TABLE 6.4: BUILDING COUNTS FOR THE SOUTHEASTERN NC REGION

Location	Total Housing Units (2017)	Units Built 2010 or later	% Building Stock built Post-2010
Brunswick County	**92,284**	**12,429**	**13.5%**
Bald Head Island	1,200	38	3.2%
Belville	909	15	1.7%
Boiling Spring Lakes	1,434	89	6.2%
Bolivia	83	-	0.0%
Calabash	1,535	52	3.4%
Carolina Shores	2,532	111	4.4%
Holden Beach	2,525	36	1.4%
Leland	8,041	1,322	16.4%
Navassa	747	24	3.2%
Northwest	394	9	2.3%
Oak Island	9,001	228	2.5%
Ocean Isle Beach	3,409	52	1.5%
Sandy Creek	109	8	7.3%
Shallotte	2,076	79	3.8%
Southport	1,907	162	8.5%
St. James	2,978	656	22.0%
Sunset Beach	5,157	242	4.7%
Varnamtown	296	-	0.0%
Unincorporated Area	47,951	9,306	19.4%
New Hanover County	**107,369**	**4,319**	**4.0%**
Carolina Beach	5,744	143	2.5%
Kure Beach	2,185	80	3.7%
Wilmington	57,147	2,013	3.5%
Wrightsville	2,826	-	0.0%
Unincorporated Area	39,467	2,083	5.3%
Onslow County	**77,453**	**11,151**	**14.4%**
Holly Ridge	1,196	438	36.6%
Jacksonville	23,717	3,409	14.4%
North Topsail Beach	2,571	60	2.3%
Richlands	853	258	30.2%
Swansboro	1,562	200	12.8%
Unincorporated Area	47,554	6,786	14.3%
Pender County	**28,115**	**1,547**	**5.5%**
Atkinson	143	-	0.0%
Burgaw	1,348	-	0.0%
St. Helena	194	2	1.0%
Surf City	3,780	302	8.0%
Topsail Beach	1,295	34	2.6%
Watha	104	2	1.9%
Unincorporated Area	21,251	1,207	5.7%
Southeastern NC Regional Total	**305,221**	**29,446**	**9.6%**

Table 6.5 shows population growth estimates for the region from 2010 to 2018 based on the US Census Annual Estimates of Resident Population and 2018 population estimates.

TABLE 6.5: POPULATION GROWTH FOR THE SOUTHEASTERN NC REGION

Location	2010	2014	2018	% Change
Brunswick County	**108,065**	**118,308**	**136,744**	**26.5%**
Bald Head Island	158	165	179	13.3%
Belville	1,940	2,019	2,073	6.9%
Boiling Spring Lakes	5,439	5,655	6,137	12.8%
Bolivia	143	149	152	6.3%
Calabash	1,789	2,071	2,205	23.3%
Carolina Shores	3,386	3,571	4,378	29.3%
Holden Beach	576	605	647	12.3%
Leland	14,030	17,016	22,070	57.3%
Navassa	1,484	1,631	2,119	42.8%
Northwest	729	756	776	6.4%
Oak Island	6,818	7,221	8,072	18.4%
Ocean Isle Beach	536	564	631	17.7%
Sandy Creek	259	434	421	62.5%
Shallotte	3,511	3,703	4,287	22.1%
Southport	2,914	3,280	3,828	31.4%
St. James	3,194	4,321	5,837	82.7%
Sunset Beach	3,571	3,697	3,952	10.7%
Varnamtown	549	568	585	6.6%
Unincorporated Area	57,039	60,882	68,395	19.9%
New Hanover County	**203,286**	**215,996**	**232,274**	**14.3%**
Carolina Beach	5,724	6,024	6,354	11.0%
Kure Beach	2,015	2,073	2,102	4.3%
Wilmington	106,454	113,309	122,607	15.2%
Wrightsville	2,476	2,532	2,542	2.7%
Unincorporated Area	86,617	92,058	98,669	13.9%
Onslow County	**186,889**	**191,820**	**197,683**	**5.8%**
Holly Ridge	1,317	1,940	2,598	97.3%
Jacksonville	77,929	74,034	72,896	-6.5%
North Topsail Beach	745	724	739	-0.8%
Richlands	1,508	1,627	1,676	11.1%
Swansboro	2,692	3,037	3,273	21.6%
Unincorporated Area	102,698	110,458	116,501	13.4%
Pender County	**52,416**	**55,908**	**62,162**	**18.6%**
Atkinson	300	318	351	17.0%
Burgaw	3,862	3,987	4,140	7.2%
St. Helena	399	412	425	6.5%
Surf City	1,921	2,123	2,417	25.8%
Topsail Beach	369	389	427	15.7%
Watha	194	224	241	24.2%
Unincorporated Area	45,371	48,455	54,161	19.4%
Southeastern NC Regional Total	**550,656**	**582,032**	**628,863**	**14.2%**

6.5 VULNERABILITY ASSESSMENT RESULTS

As noted earlier, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results are presented here. All other hazards are assumed to impact the entire planning region (drought, excessive heat, hailstorm, lightning, and severe winter weather) or, due to lack of data, analysis would not lead to credible results (dam failure, infectious disease, terrorism, cyber, EMP). The total region exposure for critical facilities is presented in **Table 6.26**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table 6.26**.

The hazards presented in this subsection include:

- Hurricane and Coastal Hazards,
- Tornadoes/Thunderstorms,
- Earthquakes,
- Geological Hazards (Sinkholes and Coastal Erosion)
- Flooding,
- Wildfires, and
- Hazardous Substances.

6.5.1. Hurricane and Coastal Hazards

Historical evidence indicates that the Southeastern NC Region has a significant risk to the hurricane and tropical storm hazard, mostly due to its proximity of the region to the Atlantic Ocean. In recent years, there have been 16 Disaster Declarations from hurricanes in the region (Hurricane Diana, Hurricane Hugo, Hurricane Bertha, Hurricane Fran, Hurricane Bonnie, Hurricane Dennis, Hurricane Floyd, Hurricane Isabel, Hurricane Ophelia, Tropical Storm Hanna, Tropical Storm Nicole, Hurricane Irene, Hurricane Matthew, Hurricane Florence, Tropical Storm Michael, and Hurricane Dorian). Many more storm tracks have come near or traversed through the region, as shown and discussed in Section 5: *Hazard Profiles*.

Numerous secondary hazards, such as erosion, flooding, tornadoes, and high winds, tend to be a result of hurricanes or tropical storms. These cumulative effects often make potential loss estimates difficult to calculate and track.

NCEM's Risk Management Tool analyzes hurricane winds and no other hazards often associated with hurricanes; therefore, only hurricane winds are analyzed in this section. Building and population vulnerabilities to hurricane winds in a 100-year frequency (return period) are reported in the following **Table 6.6** and **Table 6.7**.

It is assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard.

TABLE 6.6: BUILDING VULNERABILITIES TO HURRICANE WINDS IN THE SOUTHEASTERN NC REGION

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**21,056**	**60,032**	**694,510,276**	**3,198**	**107,000,428**	**693**	**30,185,830**	**63,923**	**831,696,535**

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Bald Head Island	124	988	52,831,729	40	2,262,545	11	110,931	1,039	55,205,206
Belville	205	759	5,805,715	36	754,860	5	44,598	800	6,605,173
Boiling Spring Lakes	673	1,874	13,330,489	36	343,597	31	726,518	1,941	14,400,604
Bolivia	260	227	1,225,745	22	237,179	15	390,451	264	1,853,375
Calabash	645	1,246	8,703,469	107	2,188,771	8	244,879	1,361	11,137,119
Carolina Shores	509	1,515	11,515,552	46	1,232,792	2	34,833	1,563	12,783,178
Holden Beach	281	1,954	101,897,415	8	160,536	2	169,320	1,964	102,227,271
Leland	1,104	2,719	16,084,836	146	3,088,006	45	2,257,068	2,910	21,429,910
Navassa	398	617	1,779,108	52	2,678,608	19	202,624	688	4,660,341
Northwest	264	424	1,961,123	19	194,545	11	238,554	454	2,394,222
Oak Island	1,458	6,646	75,061,287	220	4,791,682	38	1,021,205	6,904	80,874,174
Ocean Isle Beach	318	2,856	84,733,571	92	8,936,222	9	575,010	2,957	94,244,803
Sandy Creek	145	137	326,114	10	86,150	2	5,727	149	417,990
Shallotte	786	1,510	14,510,445	321	8,876,304	86	3,228,249	1,917	26,614,998
Southport	916	1,554	25,825,938	228	10,915,119	49	912,720	1,831	37,653,778
St. James	-	1,362	40,201,633	17	408,442	2	39,620	1,381	40,649,694
Sunset Beach	145	3,347	58,505,993	91	4,113,054	8	175,036	3,446	62,794,082
Varnamtown	219	338	2,515,599	16	253,758	6	127,162	360	2,896,519
Unincorporated Area	12,606	29,959	177,694,515	1,691	55,478,258	344	19,681,325	31,994	252,854,098
New Hanover County	**37,801**	**80,659**	**3,131,725,196**	**5,600**	**445,960,974**	**883**	**66,037,785**	**87,142**	**3,643,723,953**
Carolina Beach	1,571	3,418	382,821,884	202	26,576,773	28	3,485,140	3,648	412,883,797
Kure Beach	631	1,654	230,687,121	28	5,327,738	11	1,456,979	1,693	237,471,838
Wilmington	23,334	37,215	837,193,505	2,978	277,750,149	565	42,666,711	40,758	1,157,610,364
Wrightsville	668	1,624	534,142,910	68	10,304,961	17	1,117,397	1,709	545,565,267
Unincorporated Area	11,597	36,748	1,146,879,776	2,324	126,001,353	262	17,311,558	39,334	1,290,192,687
Onslow County	**40,369**	**62,388**	**533,748,018**	**3,375**	**261,412,040**	**4,589**	**389,668,198**	**70,352**	**1,184,828,259**
Holly Ridge	788	741	3,509,878	81	3,929,271	20	2,129,529	842	9,568,678
Jacksonville	15,729	19,801	173,748,090	1,293	156,867,610	3,719	268,403,504	24,813	599,019,204
North Topsail Beach	604	1,490	57,721,695	7	208,727	5	96,049	1,502	58,026,471
Richlands	731	975	10,956,029	87	7,830,485	51	10,583,899	1,113	29,370,414
Swansboro	809	1,733	21,349,252	163	13,018,153	50	18,140,415	1,946	52,507,821
Unincorporated Area	21,708	37,648	266,463,074	1,744	79,557,794	744	90,314,802	40,136	436,335,671
Pender County	**9,780**	**29,429**	**281,900,514**	**3,574**	**44,266,151**	**422**	**17,322,703**	**33,425**	**343,489,369**
Atkinson	206	164	1,145,000	36	282,571	14	262,789	214	1,690,360
Burgaw	1,340	1,412	11,363,209	340	9,908,246	87	3,273,363	1,839	24,544,818
St. Helena	124	209	2,088,045	54	380,428	7	118,777	270	2,587,250
Surf City	505	2,977	63,555,593	150	3,495,281	14	300,983	3,141	67,351,858
Topsail Beach	294	1,110	29,464,966	21	534,796	5	140,305	1,136	30,140,067
Watha	123	232	2,115,270	32	231,169	10	299,864	274	2,646,303
Unincorporated Area	7,073	22,984	157,435,640	2,927	28,386,793	282	12,691,545	26,193	198,513,978
Southeastern NC Regional Total	**108,891**	**232,167**	**4,627,151,213**	**15,733**	**857,592,726**	**6,584**	**502,979,439**	**254,484**	**5,987,723,381**

Source: NCEM Risk Management Tool

TABLE 6.7: POPULATION VULNERABILITIES TO HURRICANE WINDS IN THE SOUTHEASTERN NC REGION

Location	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	**22,708**	**5,748**	**105,925**
Bald Head Island	32	8	149
Belville	407	103	1,897
Boiling Spring Lakes	1,143	289	5,333
Bolivia	73	18	339
Calabash	462	117	2,154
Carolina Shores	886	224	4,136
Holden Beach	109	28	508
Leland	2,823	715	13,171
Navassa	325	82	1,514
Northwest	170	43	793
Oak Island	1,310	331	6,107
Ocean Isle Beach	329	83	1,534
Sandy Creek	57	14	266
Shallotte	1,049	266	4,895
Southport	778	197	3,629
St. James	686	174	3,198
Sunset Beach	729	185	3,400
Varnamtown	111	28	519
Unincorporated Area	11,229	2,843	52,383
New Hanover County	**28,034**	**11,698**	**202,267**
Carolina Beach	770	321	5,555
Kure Beach	269	112	1,940
Wilmington	14,696	6,133	106,030
Wrightsville	332	138	2,397
Unincorporated Area	11,967	4,994	86,345
Onslow County	**13,196**	**16,908**	**176,893**
Holly Ridge	118	151	1,583
Jacksonville	6,525	8,360	87,457
North Topsail Beach	48	61	642
Richlands	158	203	2,123
Swansboro	268	344	3,603
Unincorporated Area	6,079	7,789	81,485
Pender County	**7,876**	**3,078**	**52,206**
Atkinson	45	17	296
Burgaw	663	258	4,384
St. Helena	57	22	378
Surf City	250	116	1,790
Topsail Beach	46	18	308
Watha	66	25	434
Unincorporated Area	6,749	2,622	44,616
Southeastern NC Regional Total	**71,814**	**37,432**	**537,291**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

Given the equal susceptibility across the Southeastern NC Region, it can be assumed that the entire population is at risk to the hurricane and tropical storm hazard.

CRITICAL FACILITIES

Given equal vulnerability across the Southeastern NC Region, all critical facilities are considered to be at risk. Although some buildings may perform better than others in the face of such an event due to construction, age, and other factors, determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table 6.26** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the Southeastern NC Region. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

6.5.2 Tornadoes/Thunderstorms

Tornadoes

A probabilistic scenario was created to estimate building and population vulnerabilities in the Southeastern NC Region for the tornado hazard. For this scenario, a tornado ranked F2 on the Fujita scale was analyzed. The Risk Management Tool analyzed this information which has been reported in **Table 6.8** and **Table 6.9**.

TABLE 6.8: BUILDING VULNERABILITY TO THE TORNADOES HAZARD

Location	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
	Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**61,825**	**$6,532,380,272**	**3,163**	**$1,190,948,508**	**696**	**$370,405,929**	**65,684**	**$8,093,734,706**
Bald Head Island	1,044	$450,311,833	40	$22,341,143	10	$1,830,919	1,094	$474,483,896
Belville	753	$100,619,696	26	$11,647,370	5	$1,117,576	784	$113,384,642
Boiling Spring Lakes	1,874	$197,554,685	36	$8,106,407	31	$26,059,657	1,941	$231,720,748
Bolivia	227	$20,674,146	21	$4,900,661	16	$49,405,401	264	$34,980,207
Calabash	1,246	$114,617,225	108	$35,608,106	8	$4,631,804	1,362	$154,857,135
Carolina Shores	1,559	$169,181,078	44	$16,711,996	3	$2,476,443	1,606	$188,369,517
Caswell Beach	417	$81,652,429	14	$9,642,213	3	$3,905304	434	$95,199,945
Holden Beach	2,171	$334,747,314	23	$5,621,408	4	$1,513,262	2,198	$341,881,983
Leland	2,718	$261,870,247	146	$51,416,147	45	$24,215,571	2,909	$337,501,965
Navassa	619	$35,019,441	50	$25,284,112	19	$3,136,242	688	$63,439,794
Northwest	424	$27,647,321	19	$3,474,157	11	$2,051,824	454	$33,173,301
Oak Island	7,462	$748,922,690	217	$51,322,355	40	$14,024,192	7,719	$814,269,237
Ocean Isle Beach	3,088	$502,857,302	91	$23,984,274	9	$4,330,726	3,188	$531,172,301
Sandy Creek	137	$7,260,367	10	$1,119,284	2	$124,793	149	$8,504,433
Shallotte	1,488	$172,802,237	337	$147,686,979	78	$40,022,187	1,903	$360,511,404
Southport	1,563	$226,639,234	205	$94,889,679	50	$30,746,854	1,818	$352,275,767
St. James	1,363	$381,923,436	13	$7,217,382	5	$1,401,081	1,381	$390,541,899
Sunset Beach	3,348	$457,346,243	91	$77,123,415	7	$3,323,685	3,446	$537,793,343
Varnamtown	338	$28,645,605	16	$3,373,073	6	$1,758,625	360	$33,777,303

Location	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
	Number	Damages	Number	Damages	Number	Damages	Number	Damages
Unincorporated Area	29,986	$2,268,849,354	1,656	$601,299,099	344	$208,651,205	31,989	$3,078,799,658
New Hanover County	**81,160**	**$22,522,460,475**	**5,132**	**$7,384,819,728**	**1,023**	**$1,848,956,858**	**87,315**	**$31,756,237,059**
Carolina Beach	3,496	$1,213,514,296	207	$145,569,008	28	$34,085,021	3,731	$1,393,168,326
Kure Beach	1,706	$818,399,298	27	$29,311,830	12	$16,401,250	1,745	$864,112,377
Wilmington	37,397	$9,316,253,298	2,664	$4,541,140,157	673	$1,207,306,049	40,734	$15,064,699,504
Wrightsville Beach	1,674	$2,011,994,124	62	$114,716,113	17	$4,001,076	1,753	$2,130,711,312
Unincorporated Area	36,887	$9,162,299,459	2,172	$2,554,082,620	293	$587,163,462	39,352	$12,303,545,540
Onslow County	**62,771**	**$5,338,480,359**	**3,389**	**$1,896,279,430**	**4,616**	**$3,022,643,238**	**70,776**	**$10,257,403,028**
Holly Ridge	741	$44,556,963	81	$39,172,275	20	$11,036,379	842	$94,765,617
Jacksonville	19,801	$1,934,365,940	1,293	$1,159,310,250	3,740	$2,355,557,361	24,834	$5,449,233,551
North Topsail Beach	1,638	$223,492,725	8	$1,065,512	5	$1,030,439	1,651	$225,588,676
Richlands	975	$92,752,895	87	$42,553,960	51	$41,896,579	1,113	$177,203,434
Swansboro	1,827	$176,283,766	164	$86,810,280	50	$75,402,559	2,041	$338,496,605
Unincorporated Area	37,789	$2,867,028,070	1,756	$567,367,153	750	$537,719,921	40,295	$3,972,115,145
Pender County	**29,362**	**$2,609,305,060**	**3,566**	**$776,664,106**	**419**	**$203,677,092**	**33,347**	**$3,589,646,257**
Atkinson	164	$13,829,966	36	$4,427,644	14	$3,233,274	214	$21,490,884
Burgaw	1,412	$132,628,146	340	$139,152,796	87	$34,832,288	1,839	$306,613,230
St. Helena	209	$19,202,936	54	$4,536,430	7	$1,428,949	270	$25,168,314
Surf City	3,087	$301,964,018	150	$42,665,174	14	$3,409,750	3,251	$348,038,941
Topsail Beach	1,274	$125,579,700	27	$3,825,173	5	$886,820	1,306	$130,291,694
Watha	232	$17,410,473	32	$3,292,338	10	$2,201,752	274	$22,904,563
Unincorporated Area	22,984	$1,998,689,821	2,927	$578,764,551	282	$157,684,259	26,193	$2,735,138,631
Southeastern NC Regional Total	**235,118**	**$37,002,626,166**	**15,250**	**$11,248,711,772**	**6,754**	**$5,445,683,117**	**257,122**	**$53,697,021,050**

TABLE 6.9: POPULATION VULNERABILITY TO THE TORNADOES HAZARD

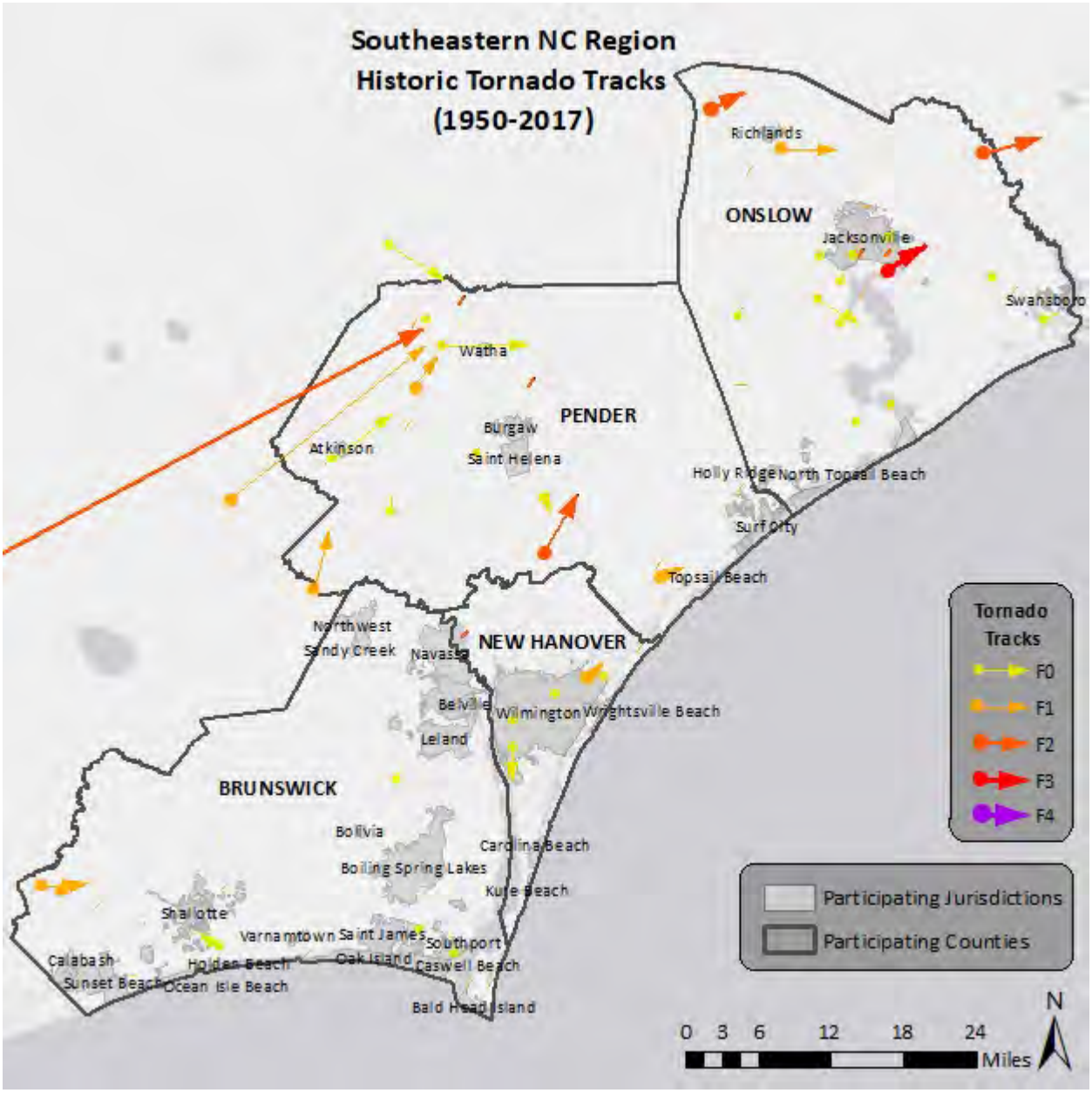
Location	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	**22,940**	**5,807**	**107,011**
Bald Head Island	34	8	157
Belville	407	103	1,897
Boiling Spring Lakes	1,143	289	5,333
Bolivia	73	18	339
Calabash	462	117	2,154
Carolina Shores	912	231	4,256
Holden Beach	121	31	565
Leland	2,823	715	13,171
Navassa	325	82	1,514
Northwest	170	43	793
Oak Island	1,470	372	6,855
Ocean Isle Beach	355	90	1,657
Sandy Creek	57	14	266
Shallotte	1,049	266	4,895
Southport	782	198	3,650
St. James	686	174	3,198
Sunset Beach	729	185	3,400

Location	Elderly at Risk	Children at Risk	Total at Risk
Varnamtown	111	28	519
Unincorporated Area	11,231	2,843	52,392
New Hanover County	**28,092**	**11,724**	**202,688**
Carolina Beach	788	329	5,687
Kure Beach	277	116	2,001
Wilmington	14,696	6,133	106,030
Wrightsville	341	142	2,461
Unincorporated Area	11,990	5,004	86,509
Onslow County	**13,238**	**16,962**	**177,459**
Holly Ridge	118	151	1,583
Jacksonville	6,525	8,360	87,457
North Topsail Beach	52	67	706
Richlands	158	203	2,123
Swansboro	283	363	3,798
Unincorporated Area	6,102	7,818	81,792
Pender County	**7,892**	**3,085**	**52,317**
Atkinson	45	17	296
Burgaw	663	258	4,384
St. Helena	57	22	378
Surf City	259	120	1,856
Topsail Beach	53	21	353
Watha	66	25	434
Unincorporated Area	6,749	2,622	44,616
Southeastern NC Regional Total	**72,162**	**37,578**	**539,475**

Source: NCEM Risk Management Tool

A map of historical tornado points of origin and paths can be seen below in **Figures 6.6.**

FIGURE 6.6: HISTORICAL TORNADO TRACKS



Thunderstorms

A probabilistic scenario was created to estimate building and population vulnerabilities in the Southeastern NC Region for the thunderstorm hazard. For this scenario, damages due to thunderstorm winds on a 50-year frequency event (return period) were analyzed. It is important to note that this data does not include damages caused by other sub-hazards associates with thunderstorms, such as lightning or hail. This Risk Management Tool analyzed this information which has been reported below in **Table 6.10** and **Table 6.11**.

TABLE 6.10: BUILDING VULNERABILITY TO THUNDERSTORM WINDS

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**21,056**	**60,032**	**$28,292,423**	**3,198**	**$5,075,527**	**693**	**$860,385**	**63,923**	**$34,228,336**
Bald Head Island	124	988	$1,249,396	40	$201,694	11	$3,395	1,039	$1,454,486
Belville	205	759	$342,730	36	$8,967	5	$601	800	$352,298
Boiling Spring Lakes	673	1,874	$805,539	36	$3,435	31	$9,478	1,941	$818,452
Bolivia	260	227	$85,604	22	$18,826	15	$3,457	264	$107,887
Calabash	645	1,246	$567,052	107	$84,415	8	$1,940	1,361	$653,407
Carolina Shores	509	1,515	$943,079	46	$72,127	2	$348	1,563	$1,015,554
Holden Beach	281	1,954	$2,329,149	8	$3,929	2	$588	1,964	$2,333,665
Leland	1,104	2,719	$1,157,438	146	$59,355	45	$97,005	2,910	$1,313,799
Navassa	398	617	$155,646	52	$106,407	19	$3,623	688	$265,676
Northwest	264	424	$97,974	19	$3,120	11	$2,361	454	$103,455
Oak Island	1,458	6,646	$2,554,310	220	$170,457	38	$25,569	6,904	$2,750,336
Ocean Isle Beach	318	2,856	$2,004,931	92	$187,470	9	$9,226	2,957	$2,201,627
Sandy Creek	145	137	$24,273	10	$2,572	2	$65	149	$26,909
Shallotte	786	1,510	$824,897	321	$145,183	86	$42,079	1,917	$1,012,159
Southport	916	1,554	$990,015	228	$1,133,281	49	$48,130	1,831	$2,171,426
St. James	-	1,362	$1,714,439	17	$28,734	2	$717	1,381	$1,743,891
Sunset Beach	145	3,347	$2,081,797	91	$260,490	8	$2,211	3,446	$2,344,498
Varnamtown	219	338	$130,261	16	$8,510	6	$1,052	360	$139,823
Unincorporated Area	12,606	29,959	$10,233,893	1,691	$2,576,555	344	$608,540	31,994	$13,418,988
New Hanover County	**37,801**	**80,659**	**$88,306,248**	**5,600**	**$19,525,319**	**883**	**$2,551,966**	**87,142**	**$110,383,532**
Carolina Beach	1,571	3,418	$5,401,209	202	$499,708	28	$25,502	3,648	$5,926,419
Kure Beach	631	1,654	$3,114,064	28	$126,766	11	$15,788	1,693	$3,256,618
Wilmington	23,334	37,215	$33,766,726	2,978	$13,645,219	565	$1,771,492	40,758	$49,183,437
Wrightsville	668	1,624	$10,652,469	68	$241,794	17	$12,294	1,709	$10,906,556
Unincorporated Area	11,597	36,748	$35,371,780	2,324	$5,011,832	262	$726,890	39,334	$41,110,502
Onslow County	**40,369**	**62,388**	**$25,553,414**	**3,375**	**$18,253,011**	**4,589**	**$29,544,015**	**70,352**	**$73,350,440**
Holly Ridge	788	741	$206,971	81	$440,692	20	$297,438	842	$945,101
Jacksonville	15,729	19,801	$8,253,960	1,293	$9,129,020	3,719	$21,888,734	24,813	$39,271,714
North Topsail Beach	604	1,490	$1,365,142	7	$3,942	5	$2,081	1,502	$1,371,165
Richlands	731	975	$544,853	87	$290,200	51	$313,590	1,113	$1,148,643
Swansboro	809	1,733	$905,378	163	$1,139,889	50	$941,303	1,946	$2,986,570
Unincorporated Area	21,708	37,648	$14,277,110	1,744	$7,249,268	744	$6,100,869	40,136	$27,627,247
Pender County	**9,665**	**29,088**	**$11,964,777**	**3,560**	**$1,636,279**	**419**	**$389,438**	**33,067**	**$13,990,493**
Atkinson	206	164	$57,442	36	$6,503	14	$3,281	214	$67,226
Burgaw	1,340	1,412	$595,533	340	$155,143	87	$67,993	1,839	$818,669
St. Helena	124	209	$111,505	54	$10,299	7	$1,207	270	$123,011
Surf City	505	2,977	$1,656,934	150	$124,532	14	$4,987	3,141	$1,786,453
Topsail Beach	294	1,110	$685,826	21	$25,517	5	$1,768	1,136	$713,111
Watha	123	232	$97,600	32	$2,949	10	$2,513	274	$103,061
Unincorporated Area	7,073	22,984	$8,759,937	2,927	$1,311,336	282	$307,689	26,193	$10,378,962
Southeastern NC Regional Total	**108,891**	**232,167**	**$154,116,862**	**15,733**	**$44,490,136**	**6,584**	**$33,345,804**	**254,484**	**$231,952,801**

Source: NCEM Risk Management Tool

TABLE 6.11: POPULATION VULNERABILITY TO THUNDERSTORM WINDS

Location	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	**22,708**	**5,748**	**105,925**
Bald Head Island	32	8	149
Belville	407	103	1,897
Boiling Spring Lakes	1,143	289	5,333
Bolivia	73	18	339
Calabash	462	117	2,154
Carolina Shores	886	224	4,136
Holden Beach	109	28	508
Leland	2,823	715	13,171
Navassa	325	82	1,514
Northwest	170	43	793
Oak Island	1,310	331	6,107
Ocean Isle Beach	329	83	1,534
Sandy Creek	57	14	266
Shallotte	1,049	266	4,895
Southport	778	197	3,629
St. James	686	174	3,198
Sunset Beach	729	185	3,400
Varnamtown	111	28	519
Unincorporated Area	11,229	2,843	52,383
New Hanover County	**28,034**	**11,698**	**202,267**
Carolina Beach	770	321	5,555
Kure Beach	269	112	1,940
Wilmington	14,696	6,133	106,030
Wrightsville	332	138	2,397
Unincorporated Area	11,967	4,994	86,345
Onslow County	**13,196**	**16,908**	**176,893**
Holly Ridge	118	151	1,583
Jacksonville	6,525	8,360	87,457
North Topsail Beach	48	61	642
Richlands	158	203	2,123
Swansboro	268	344	3,603
Unincorporated Area	6,079	7,789	81,485
Pender County	**7,876**	**3,078**	**52,206**
Atkinson	45	17	296
Burgaw	663	258	4,384
St. Helena	57	22	378
Surf City	250	116	1,790
Topsail Beach	46	18	308
Watha	66	25	434
Unincorporated Area	6,749	2,622	44,616
Southeastern NC Regional Total	**71,814**	**37,432**	**537,291**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

It is assumed that all existing populations and future populations area at risk to the tornadoes/ thunderstorms hazard.

CRITICAL FACILITIES

All critical facilities should still be considered at-risk to damage should an event occur. A list of all individual critical facilities in the region can be found in **Table 6.26**.

6.5.3. Earthquakes

A probabilistic scenario was created to estimate building and population vulnerabilities in the Southeastern NC Region for the earthquake hazard with a 500-year frequency (return period). The Risk Management Tool analyzed this information which has been reported below in **Table 6.12** and **Table 6.13**.

TABLE 6.12: BUILDING VULNERABILITY TO THE EARTHQUAKE HAZARD

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**21,537**	**61,407**	**$6,751,661**	**3,224**	**$2,883,283**	**705**	**$850,075**	**65,336**	**$10,485,018**
Bald Head Island	137	1,043	$220,103	40	$35,091	11	$3,735	1,094	$258,929
Belville	205	759	$50,118	36	$28,588	5	$1,687	800	$80,394
Boiling Spring Lakes	673	1,874	$133,869	36	$15,827	31	$35,183	1,941	$184,879
Bolivia	260	227	$19,570	22	$9,281	15	$14,507	264	$43,359
Calabash	645	1,246	$170,101	108	$94,856	8	$13,143	1,362	$278,101
Carolina Shores	537	1,559	$311,895	48	$63,259	2	$3,465	1,609	$378,619
Holden Beach	346	2,172	$249,401	23	$12,697	3	$4,720	2,198	$266,818
Leland	1,104	2,719	$215,023	146	$82,723	45	$34,053	2,910	$331,799
Navassa	398	617	$32,752	52	$61,370	19	$6,085	688	$100,207
Northwest	264	424	$32,749	19	$7,059	11	$4,712	454	$44,519
Oak Island	1,756	7,460	$538,439	223	$113,413	38	$29,077	7,721	$680,928
Ocean Isle Beach	370	3,086	$490,650	93	$85,673	9	$11,010	3,188	$587,333
Sandy Creek	145	137	$8,534	10	$2,007	2	$273	149	$10,814
Shallotte	786	1,510	$238,172	321	$383,671	86	$129,306	1,917	$751,148
Southport	923	1,563	$159,714	229	$286,166	49	$42,420	1,841	$488,300
St. James	-	1,362	$323,342	17	$17,561	2	$3,110	1,381	$344,013
Sunset Beach	145	3,347	$574,618	91	$168,847	8	$14,555	3,446	$758,019
Varnamtown	219	338	$31,328	16	$5,120	6	$5,723	360	$42,171
Unincorporated Area	12,624	29,964	$2,951,283	1,694	$1,410,074	355	$493,311	32,013	$4,854,668
New Hanover County	**37,881**	**80,909**	**$8,007,349**	**5,601**	**$10,036,076**	**884**	**$1,418,931**	**87,394**	**$19,462,358**
Carolina Beach	1,623	3,501	$576,495	202	$156,944	28	$44,202	3,731	$777,641
Kure Beach	640	1,706	$346,452	28	$31,356	11	$17,084	1,745	$394,892
Wilmington	23,335	37,215	$3,563,997	2,978	$6,373,795	566	$984,125	40,759	$10,921,918
Wrightsville	676	1,668	$524,631	68	$132,489	17	$14,437	1,753	$671,557
Unincorporated Area	11,607	36,819	$2,995,774	2,325	$3,341,492	262	$359,083	39,406	$6,696,350
Onslow County	**40,572**	**62,771**	**$1,227,979**	**3,389**	**$1,098,573**	**4,616**	**$2,237,418**	**70,776**	**$4,563,970**
Holly Ridge	788	741	$15,901	81	$27,267	20	$7,567	842	$50,735
Jacksonville	15,746	19,801	$432,026	1,293	$707,012	3,740	$1,858,653	24,834	$2,997,690
North Topsail Beach	657	1,638	$40,553	8	$582	5	$1,030	1,651	$42,165

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Richlands	731	975	$23,009	87	$29,375	51	$21,566	1,113	$73,950
Swansboro	839	1,827	$26,098	164	$38,789	50	$31,234	2,041	$96,121
Unincorporated Area	21,811	37,789	$690,392	1,756	$295,548	750	$317,368	40,295	$1,303,309
Pender County	**9,761**	**29,362**	**$975,672**	**3,566**	**$897,365**	**419**	**$332,047**	**33,347**	**$2,205,082**
Atkinson	206	164	$8,605	36	$7,621	14	$7,892	214	$24,118
Burgaw	1,340	1,412	$63,409	340	$213,228	87	$63,012	1,839	$339,648
St. Helena	124	209	$8,720	54	$5,675	7	$2,693	270	$17,088
Surf City	542	3,087	$64,651	150	$35,849	14	$3,620	3,251	$104,119
Topsail Beach	353	1,274	$27,429	27	$3,626	5	$1,176	1,306	$32,231
Watha	123	232	$7,479	32	$3,141	10	$4,150	274	$14,770
Unincorporated Area	7,073	22,984	$795,379	2,927	$628,225	282	$249,504	26,193	$1,673,108
Southeastern NC Regional Total	**109,751**	**234,449**	**$16,962,661**	**15,780**	**$14,915,297**	**6,624**	**$4,838,471**	**256,853**	**$36,716,428**

TABLE 6.13: POPULATION VULNERABILITY TO THE EARTHQUAKE HAZARD

Location	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	22,940	5,807	103,611
Bald Head Island	34	8	157
Belville	407	103	1,897
Boiling Spring Lakes	1,143	289	5,333
Bolivia	73	18	339
Calabash	462	117	2,154
Carolina Shores	912	231	4,256
Holden Beach	121	31	565
Leland	2,823	715	13,171
Navassa	325	82	1,514
Northwest	170	43	793
Oak Island	1,470	372	6,855
Ocean Isle Beach	355	90	1,657
Sandy Creek	57	14	266
Shallotte	1,049	266	4,895
Southport	782	198	3,650
St. James	686	174	3,198
Sunset Beach	729	185	3,40
Varnamtown	111	28	519
Unincorporated Area	11,231	2,843	52,392
New Hanover County	**28,092**	**11,724**	**202,688**
Carolina Beach	788	329	5,687
Kure Beach	277	116	2,001
Wilmington	14,696	6,133	106,030
Wrightsville	341	142	2,461
Unincorporated Area	11,990	5,004	86,509
Onslow County	**13,238**	**16,962**	**177,459**
Holly Ridge	118	151	1,583
Jacksonville	6,525	8,360	87,457

Location	Elderly at Risk	Children at Risk	Total at Risk
North Topsail Beach	52	67	706
Richlands	158	203	2,123
Swansboro	283	363	3,798
Unincorporated Area	6,102	7,818	81,792
Pender County	**7,892**	**3,085**	**52,317**
Atkinson	45	17	296
Burgaw	663	258	4,384
St. Helena	57	22	378
Surf City	259	120	1,856
Topsail Beach	53	21	353
Watha	66	25	434
Unincorporated Area	6,749	2,622	44,616
Southeastern NC Regional Total	**72,162**	**37,578**	**536,075**

SOCIAL VULNERABILITY

It is assumed that all existing populations and future populations are at risk to the earthquake hazard.

CRITICAL FACILITIES

All critical facilities should still be considered at-risk to minor damage should an event occur. A list of all individual critical facilities in the region can be found in **Table 6.26**.

In conclusion, an earthquake could potentially impact all existing and future buildings, facilities, and populations in the Southeastern NC Region. Though minor earthquakes are often recorded but not felt, they may rattle breakables and cause minimal damage. Furthermore, major earthquakes have potential to damage structures. Severe impacts of earthquakes may result in debris clean-up, service disruption, building collapse, and fatalities. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

6.5.4. Geological (Sinkholes and Coastal Erosion)

Sinkholes

The vulnerability information for sinkholes in **Table 6.14** was taken from the NC State Enhanced Hazard Mitigation Plan to determine vulnerability of structures in the Southeastern NC Region to sinkholes. For that plan, a GIS analysis was conducted to identify the number and value of buildings located within 50 yards of an existing sinkhole based on data received from the NC Geological Survey.

TABLE 6.14: SINKHOLE VULNERABILITY SUMMARY RESULTS

Location	Number of Buildings Within 50 Yards of Existing Sinkholes	Value of Buildings Within 50 Yards of Existing Sinkholes
Brunswick County	**1,693**	**$274,060,857**
New Hanover County	1,223	$617,106,193
Onslow County	1,311	$50,397,642
Pender County	97	$4,325,222
Southeastern NC Regional Total	**4,324**	**$945,889,914.00**

Coastal Erosion

The vulnerability information for coastal erosion in **Table 6.15** was taken from the NC State Enhanced Hazard Mitigation Plan to determine vulnerability of structures in the Southeastern NC Region to coastal erosion. For that plan, a GIS analysis was conducted to identify the number and value of buildings located within 50 yards of eroding shorelines as identified by the NC Division of Coastal Management.

TABLE 6.15: COASTAL EROSION VULNERABILITY SUMMARY RESULTS

Location	Number of Buildings within 50 Yards of Eroding Shoreline	Value of Buildings within 50 Yards of Eroding Shoreline
Brunswick County	**101**	**$16,954,506**
New Hanover County	**39**	**$30,862,658**
Onslow County	**130**	**$21,965,739**
Pender County	**52**	**$4,569,816**
Southeastern NC Regional Total	**322**	**$74,352,719.00**

SOCIAL VULNERABILITY

Given the small physical area impacted by coastal erosion (primarily located directly along beaches) it is assumed that a low amount of the population is at risk. There may be some populations/property owners that could be particularly vulnerable (potentially elderly populations) but further analysis would be needed to properly document that assumption.

CRITICAL FACITILIES

All of the critical facilities in the Southeastern NC Region are located in low incidence areas.

In conclusion, sinkholes and coastal erosion have the potential to impact existing and future buildings, facilities, and populations in the Southeastern NC Region, though some areas are at a higher risk than others due to a variety of factors. For example, proximity to existing sinkholes may increase vulnerability and proximity to eroding shorelines could increase vulnerability to coastal erosion. Specific vulnerabilities for Southeastern NC assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available

6.5.5 Flooding

Historical evidence indicates that the Southeastern NC Region is susceptible to flood events. A total of 350 flood events have been reported by the National Centers for Environmental Information since 1997, resulting in over $26 million dollars in damages.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for each of the Southeastern NC counties. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table 6.16** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE 6.16: ESTIMATED EXPOSURE OF PARCELS TO THE FLOODING HAZARD

	100 Year (1% Annual Chance) Flood Zone			500 Year (0.2% Annual Chance) Flood Zone		
Location	**Approx. Number of Parcels**	**Approx. Number of Improved Buildings**	**Approx. Improved Value of Buildings**	**Approx. Number of Parcels**	**Approx. Number of Improved Buildings**	**Approx. Improved Value of Buildings**
Brunswick County	**32,962**	**20,082**	**$5,352,591,329**	**43,932**	**26,633**	**$6,109,392,830**
Bald Head Island	1,897	931	$510,653,540	2,109	1,031	$557,013,450
Belville	80	54	$17,437,060	116	84	$23,495,440
Boiling Spring Lakes	451	251	$45,989,970	1,101	568	$93,374,430
Bolivia	24	14	$9,257,650	24	14	$9,257,650
Calabash	396	209	$56,724,795	263	132	$11,665,650
Carolina Shores	32	1	$77,040	462	370	$64,479,910
Holden Beach	2,708	2,057	$464,674,348	2,732	2,060	$466,548,168
Leland	739	443	$93,984,240	1,374	872	$184,702,400
Navassa	134	61	$4,026,060	187	91	$6,312,930
Northwest	12	7	$750,960	14	7	$750,960
Oak Island	4,829	3,629	$773,657,000	7,316	5,590	$1,030,415,440
Ocean Isle Beach	3,286	2,473	$701,633,666	3,330	2,480	$704,355,886
Sandy Creek	-	-	$0	-	-	$0
Shallotte	337	147	$49,367,090	656	315	$116,770,690
Southport	471	285	$109,124,260	768	466	$152,495,430
St. James	1,091	763	$275,342,080	1,352	958	$338,083,820
Sunset Beach	1,949	1,477	$370,489,300	2,113	1,595	$397,575,330
Varnamtown	127	78	$9,581,790	187	114	$13,075,150
Unincorporated Area	14,399	7,202	$1,859,820,480	19,828	9,886	$1,939,020,096
New Hanover County	**16,342**	**12,494**	**$4,455,975,566**	**23,756**	**18,776**	**$5,923,235,015**
Carolina Beach	2,672	2,023	$384,081,443	2,960	2,258	$428,077,243
Kure Beach	466	367	$109,515,600	899	699	$170,202,900
Wilmington	3,246	2,631	$1,475,833,477	5,863	4,903	$2,051,472,478
Wrightsville	1,883	1,544	$488,540,800	1,883	1,544	$488,540,800
Unincorporated Area	8,075	5,929	$1,998,004,246	12,151	9,372	$2,784,941,594
Onslow County	**14,374**	**9,645**	**$1,520,075,756**	**19,032**	**12,951**	**$2,034,086,338**
Holly Ridge	163	13	$3,468,300	417	67	$10,307,270

Location	100 Year (1% Annual Chance) Flood Zone			500 Year (0.2% Annual Chance) Flood Zone		
	Approx. Number of Parcels	Approx. Number of Improved Buildings	Approx. Improved Value of Buildings	Approx. Number of Parcels	Approx. Number of Improved Buildings	Approx. Improved Value of Buildings
Jacksonville	1,429	1,158	$220,778,458	3,039	2,460	$451,658,727
North Topsail Beach	3,666	2,653	$464,623,395	3,666	2,653	$464,623,395
Richlands	58	40	$10,776,427	85	60	$13,373,237
Swansboro	250	186	$26,549,306	288	219	$31,080,346
Unincorporated Area	8,808	5,595	$793,879,870	11,537	7,492	$1,063,043,363
Pender County	**14,632**	**8,905**	**$1,126,215,607**	**19,084**	**11,549**	**$1,565,757,030**
Atkinson	19	10	$930,100	25	15	$1,256,737
Burgaw	396	209	$56,724,795	572	323	$93,582,823
St. Helena	34	18	$1,462,485	54	26	$2,236,542
Surf City	4,141	3,378	$479,330,751	4,437	3,570	$516,792,223
Topsail Beach	1,850	1,504	$254,855,021	1,852	1,505	$255,021,882
Watha	10	5	$228,636	18	11	$521,613
Unincorporated Area	8,182	3,781	$332,683,819	12,126	6,099	$696,345,210
Southeastern NC Regional Total	**78,310**	**51,126**	**$12,454,858,258**	**105,804**	**69,909**	**$15,632,471,213**

Source: FEMA DFIRM

To assess flood risk, the NCEM Risk Management Tool (RMT) analyzed buildings located in the 1 percent chance of annual floodplains. The buildings are assessed by the type of building (commercial, residential, or public) and also assesses Pre-Firm buildings, or structures built before flood ordinance regulations were adopted. This data is broken down by jurisdiction in **Table 6.17**.

TABLE 6.17: BUILDING VULNERABILITY FOR THE 100-YEAR FLOODPLAINS

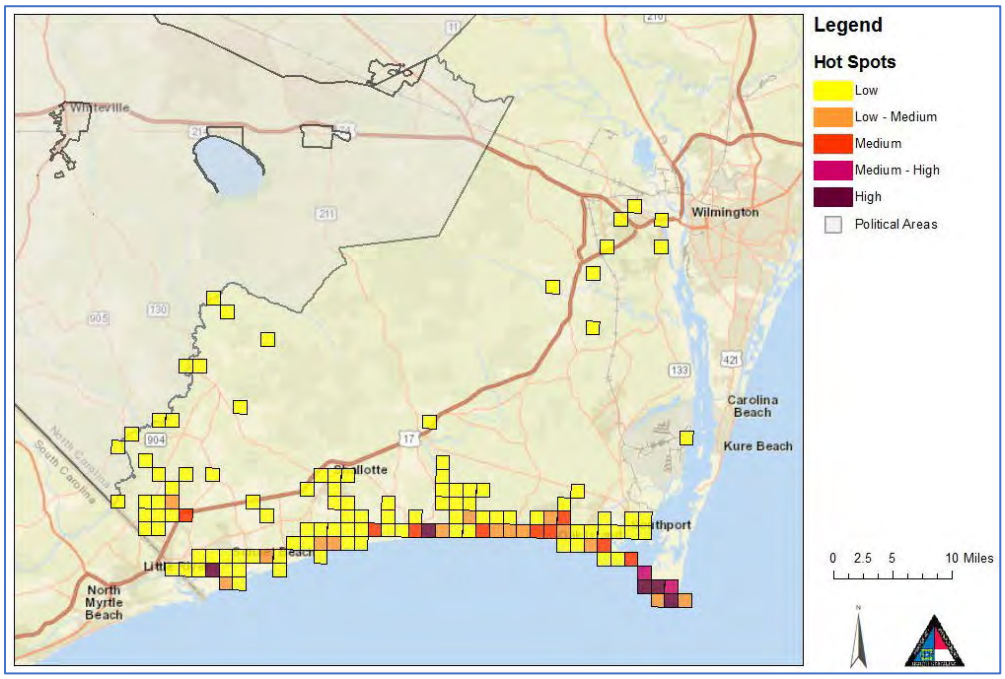
Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**1,199**	**4,088**	**$54,717,442**	**142**	**$4,447,425**	**40**	**$1,677,946**	**4,270**	**$60,842,814**
Bald Head Island	20	371	$15,335,614	16	$435,687	2	$40,137	389	$15,811,438
Belville	3	12	$107,399	2	$28,945	-	$0	14	$136,344
Boiling Spring Lakes	3	5	$6,387	1	$395	-	$0	6	$6,782
Bolivia	10	10	$18,309	-	$0	-	$0	10	$18,309
Calabash	17	23	$142,368	2	$325,663	-	$0	25	$468,031
Carolina Shores	-	-	$0	-	$0	-	$0	-	$0
Holden Beach	21	124	$1,747,026	12	$285,258	1	$114,583	137	$2,146,867
Leland	20	86	$394,015	1	$1,572	1	$32,139	88	$427,726
Navassa	-	3	$2,273	-	$0	-	$0	3	$2,273
Northwest	-	-	$0	-	$0	-	$0	-	$0
Oak Island	196	901	$7,685,320	22	$608,983	1	$52,844	924	$8,347,147
Ocean Isle Beach	13	101	$2,436,040	-	$0	-	$0	101	$2,436,040
Sandy Creek	-	-	$0	-	$0	-	$0	-	$0

Location	Pre-FIRM Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Shallotte	58	68	$430,673	25	$639,088	1	$2,410	94	$1,072,171
Southport	25	76	$1,062,181	4	$163,553	-	$0	80	$1,225,734
St. James	-	162	$2,125,924	3	$18,781	-	$0	165	$2,144,705
Sunset Beach	56	317	$4,844,976	9	$448,022	1	$100,115	327	$5,393,113
Varnamtown	12	15	$67,132	3	$71,002	-	$0	18	$138,134
Unincorporated Area	745	1,814	$18,311,805	42	$1,420,476	33	$1,335,718	1,889	$21,068,000
New Hanover County	**2,420**	**5,276**	**$245,819,484**	**258**	**$22,955,640**	**36**	**$3,353,694**	**5,570**	**$272,128,819**
Carolina Beach	667	1,102	$42,738,765	74	$7,897,306	9	$901,404	1,185	$51,537,476
Kure Beach	82	167	$3,371,723	-	$0	-	$0	167	$3,371,723
Wilmington	465	963	$12,213,874	85	$6,772,518	11	$477,653	1,059	$19,464,046
Wrightsville	399	724	$136,160,902	23	$6,682,530	9	$955,306	756	$143,798,738
Unincorporated Area	807	2,320	$51,334,220	76	$1,603,286	7	$1,019,331	2,403	$53,956,836
Onslow County	**885**	**1,426**	**$21,399,062**	**49**	**$320,606**	**7**	**$205,984**	**1,482**	**$21,925,653**
Holly Ridge	2	2	$3,306	-	$0	-	$0	2	$3,306
Jacksonville	136	147	$716,924	24	$171,230	-	$0	171	$888,154
North Topsail Beach	172	305	$9,964,075	3	$25,212	3	$47,429	311	$10,036,716
Richlands	7	29	$124,687	-	$0	-	$0	29	$124,687
Swansboro	45	52	$270,455	7	$55,146	-	$0	59	$325,601
Unincorporated Area	523	891	$10,319,615	15	$69,018	4	$158,555	910	$10,547,189
Pender County	**1,004**	**2,765**	**$37,789,196**	**171**	**$3,832,271**	**10**	**$439,794**	**2,946**	**$42,061,261**
Atkinson	4	5	$14,815	-	$0	-	$0	5	$14,815
Burgaw	107	145	$152,782	-	$0	-	$0	145	$152,782
St. Helena	4	6	$11,612	8	$8,481	-	$0	14	$20,093
Surf City	172	565	$11,592,352	75	$2,163,831	4	$209,951	644	$13,966,134
Topsail Beach	242	631	$11,625,921	21	$1,002,927	4	$183,376	656	$12,812,224
Watha	-	-	$0	-	$0	-	$0	-	$0
Unincorporated Area	475	1,413	$14,391,714	67	$657,032	2	$46,467	1,482	$15,095,213
Southeastern NC Regional Total	**5,508**	**13,555**	**$359,725,184**	**620**	**$31,555,942**	**93**	**$5,677,418**	**14,268**	**$396,958,547**

Source: NCEM Risk Management Tool

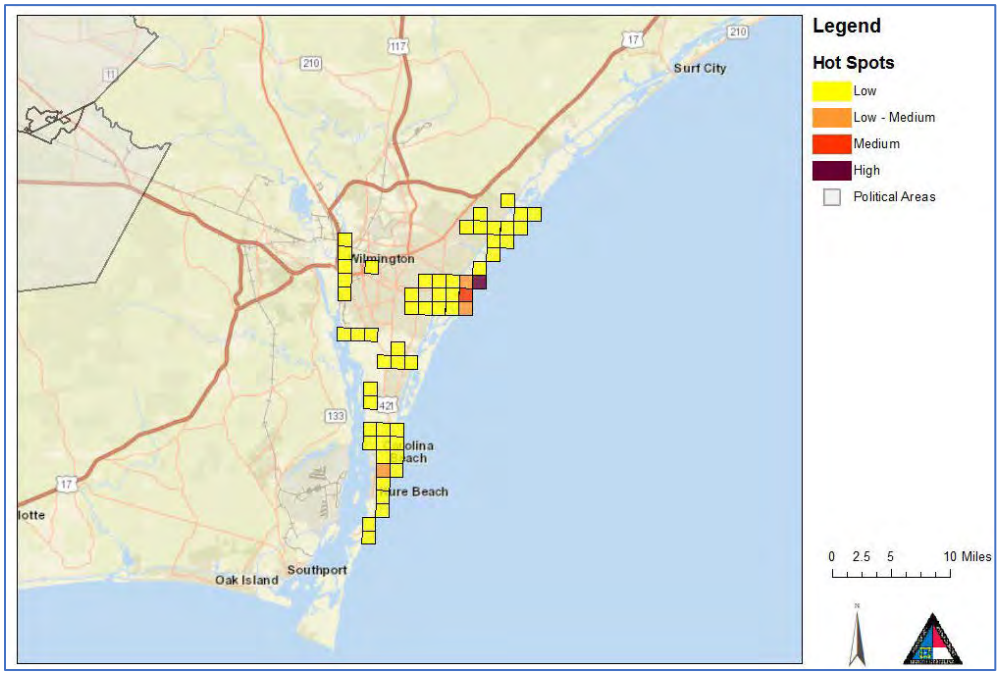
Figures 6.10 through 6.13 below display visual hotspots of potential dollar losses for the flood hazard in Brunswick, New Hanover, Onslow and Pender Counties.

FIGURE 6.10: POTENTIAL LOSSES FROM FLOODING IN BRUNSWICK COUNTY



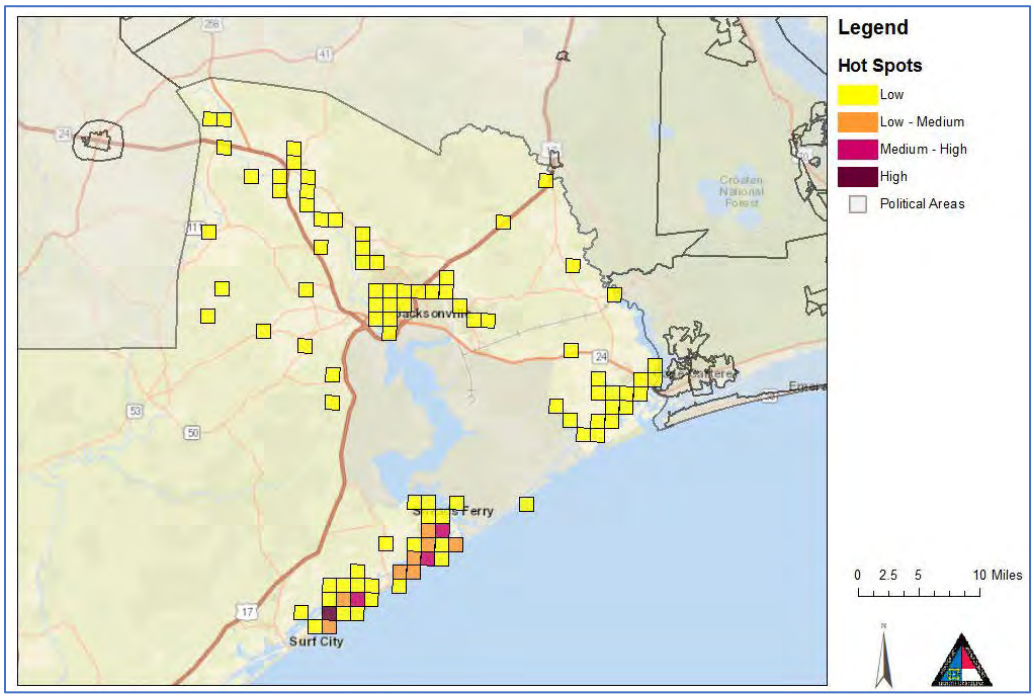
Source: NCEM Risk Management Tool

FIGURE 6.11: POTENTIAL LOSSES FROM FLOODING IN NEW HANOVER COUNTY



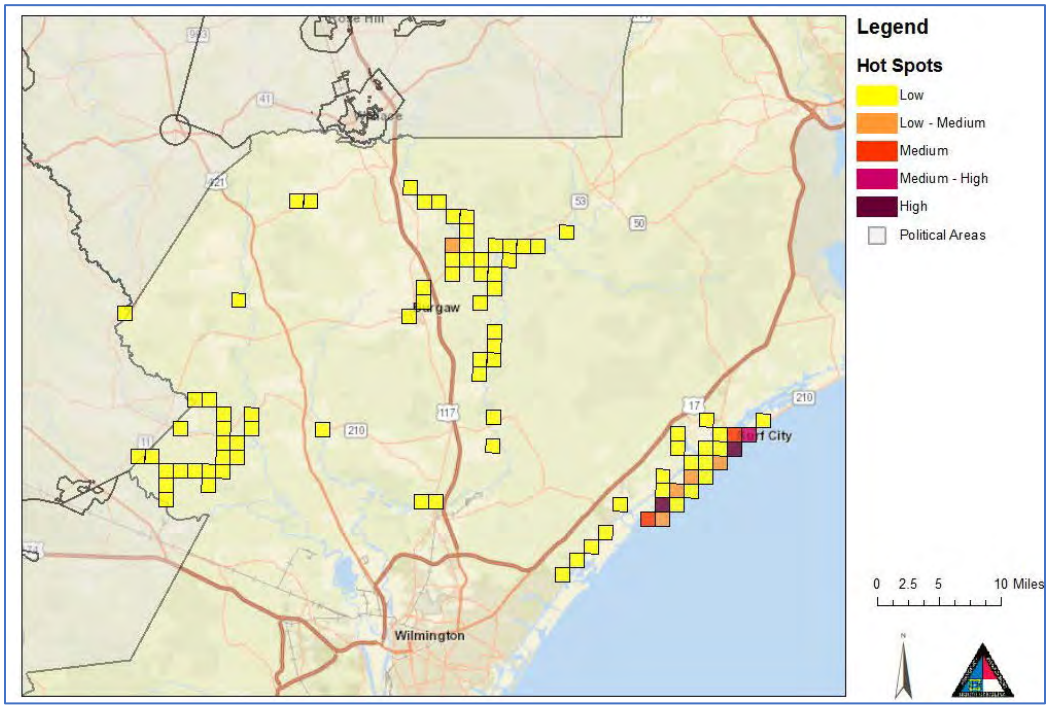
Source: NCEM Risk Management Tool

FIGURE 6.12: POTENTIAL LOSSES FOR FLOODING IN ONSLOW COUNTY



Source: NCEM Risk Management Tool

FIGURE 6.13: POTENTIAL LOSSES FOR FLOODING IN PENDER COUNTY



Source: NCEM Risk Management Tool

Table 6.18 assesses the vulnerability of the region's population. This data is also from the RMT and analyzes the populations of elderly and children living at risk to the 1 percent annual flooding.

TABLE 6.18: POPULATION VULNERABILITY FOR 100-YEAR FLOODPLAINS

Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	**1,242**	**316**	**5,786**
Bald Head Island	12	3	56
Belville	6	2	30
Boiling Spring Lakes	3	1	14
Bolivia	3	1	15
Calabash	9	2	40
Carolina Shores	-	-	-
Holden Beach	7	2	32
Leland	89	23	417
Navassa	2	-	7
Northwest	-	-	-
Oak Island	178	45	829
Ocean Isle Beach	12	3	54
Sandy Creek	-	-	-
Shallotte	47	12	220
Southport	38	10	177
St. James	82	21	380
Sunset Beach	69	18	322
Varnamtown	5	1	23
Unincorporated Area	680	172	3,170
New Hanover County	**1,546**	**646**	**11,160**
Carolina Beach	246	103	1,778
Kure Beach	27	11	195
Wilmington	380	159	2,741
Wrightsville	148	62	1,069
Unincorporated Area	745	311	5,377
Onslow County	**215**	**275**	**2,885**
Holly Ridge	-	-	4
Jacksonville	48	62	648
North Topsail Beach	10	12	131
Richlands	5	6	63
Swansboro	8	10	108
Unincorporated Area	144	185	1,931
Pender County	**560**	**221**	**3,718**
Atkinson	1	1	9
Burgaw	68	26	449
St. Helena	2	1	1
Surf City	48	22	342
Topsail Beach	26	10	175

Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Watha	-	-	-
Unincorporated Area	415	161	2,742
Southeastern NC Regional Total	**3,563**	**1,458**	**23,549**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

A national Census has not been conducted since 2010; therefore, 2010 Census tract level population counts are outdated for this update. However, population estimates from the US Census Bureau as of July 1, 2017 were available at a jurisdictional level. This data was analyzed to present at-risk populations to the flooding hazard in the Southeastern NC region and can be seen below in **Figures 6.14-6.17**.

FIGURE 6.14: BRUNSWICK COUNTY FLOODPLAINS

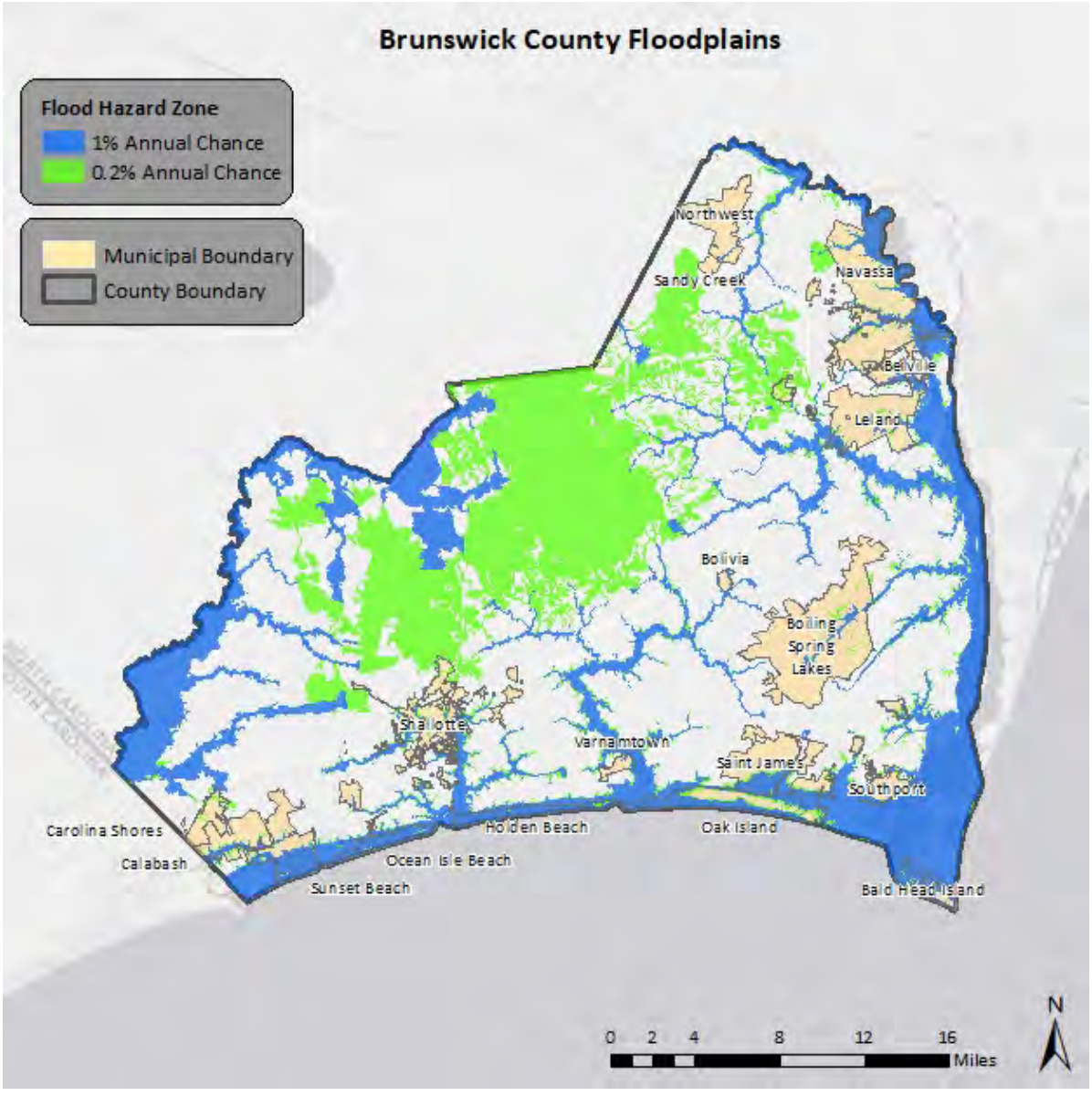


FIGURE 6.15: NEW HANOVER COUNTY FLOODPLAINS

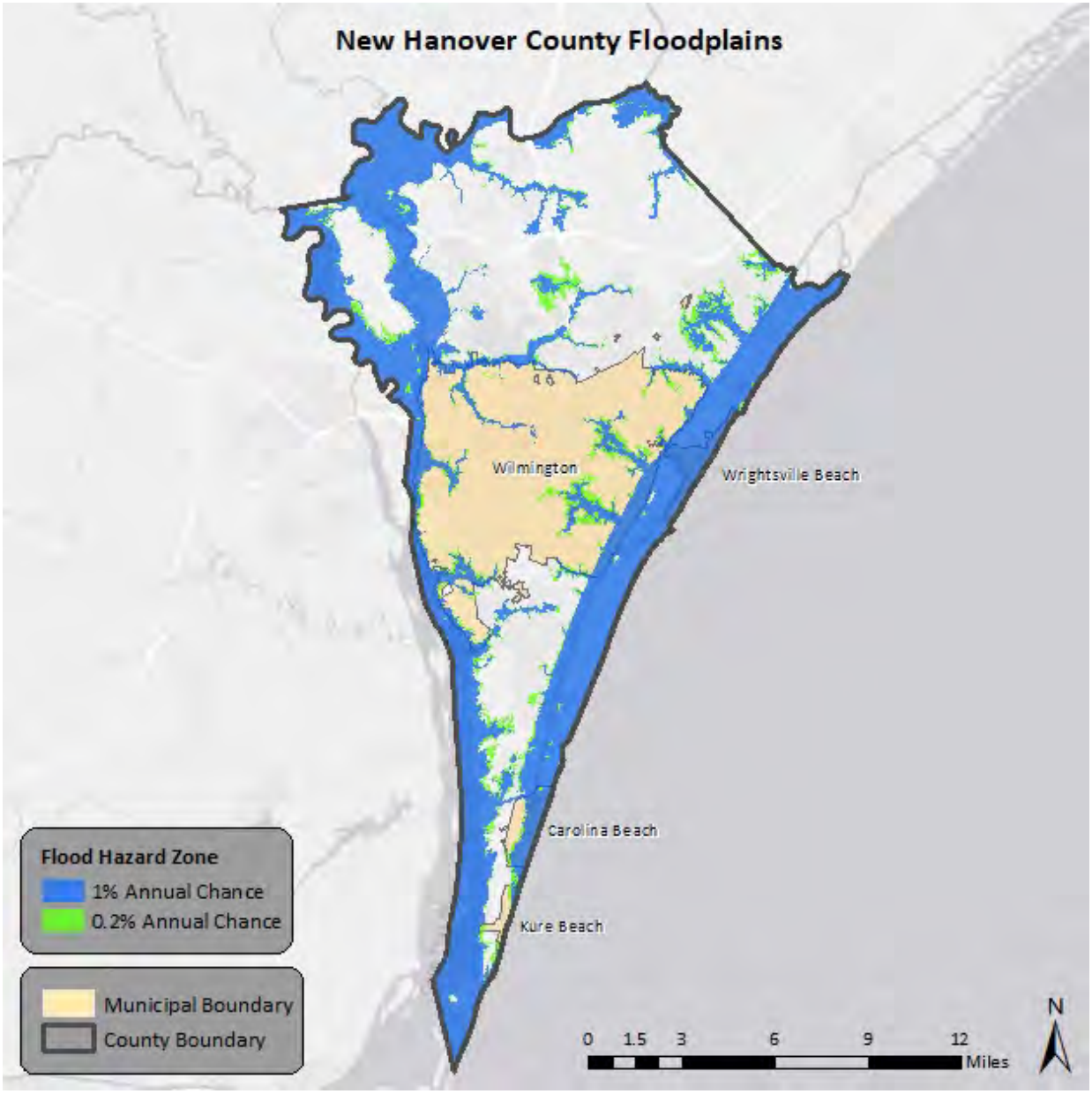


FIGURE 6.16: ONSLOW COUNTY FLOODPLAINS

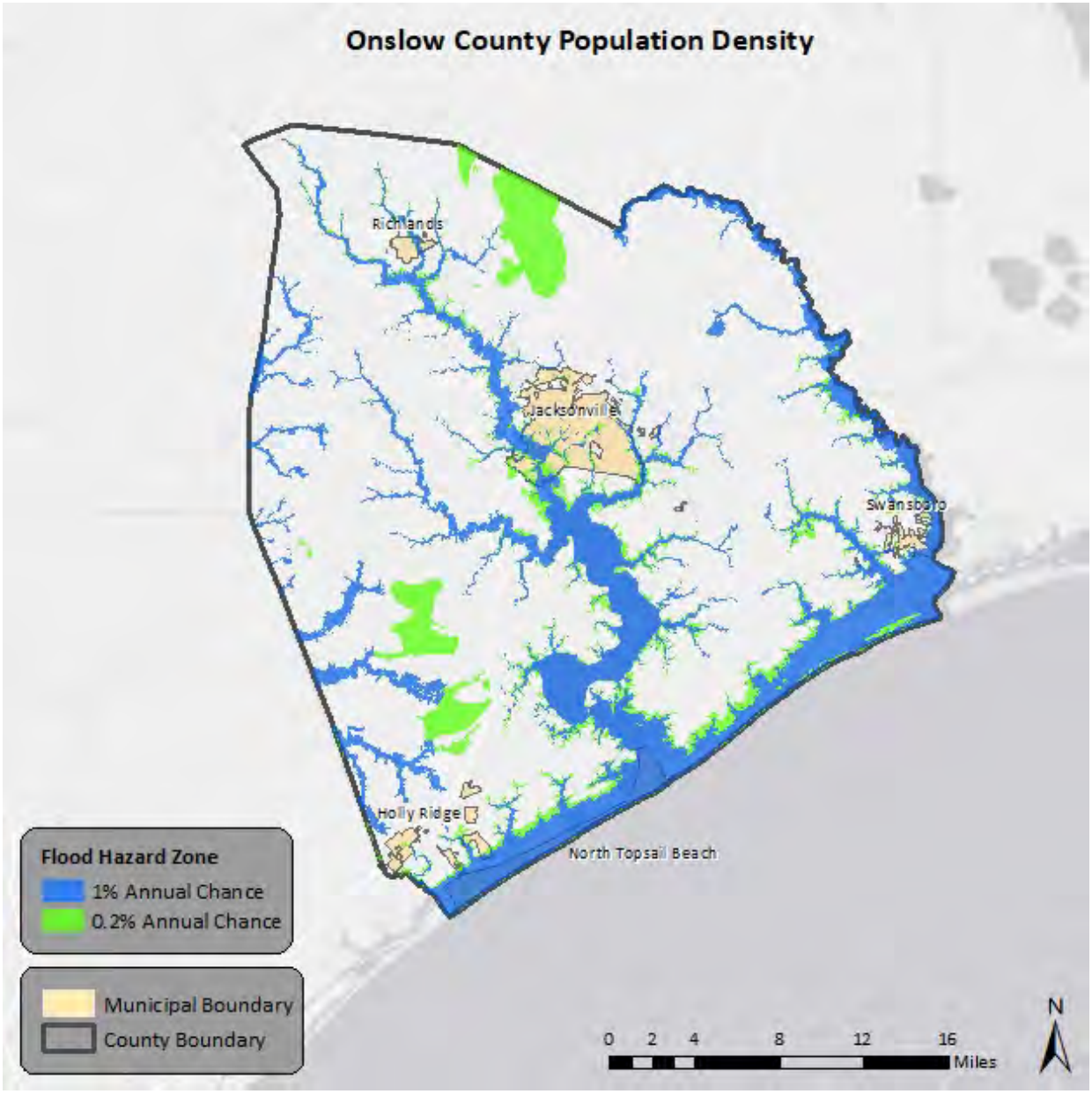
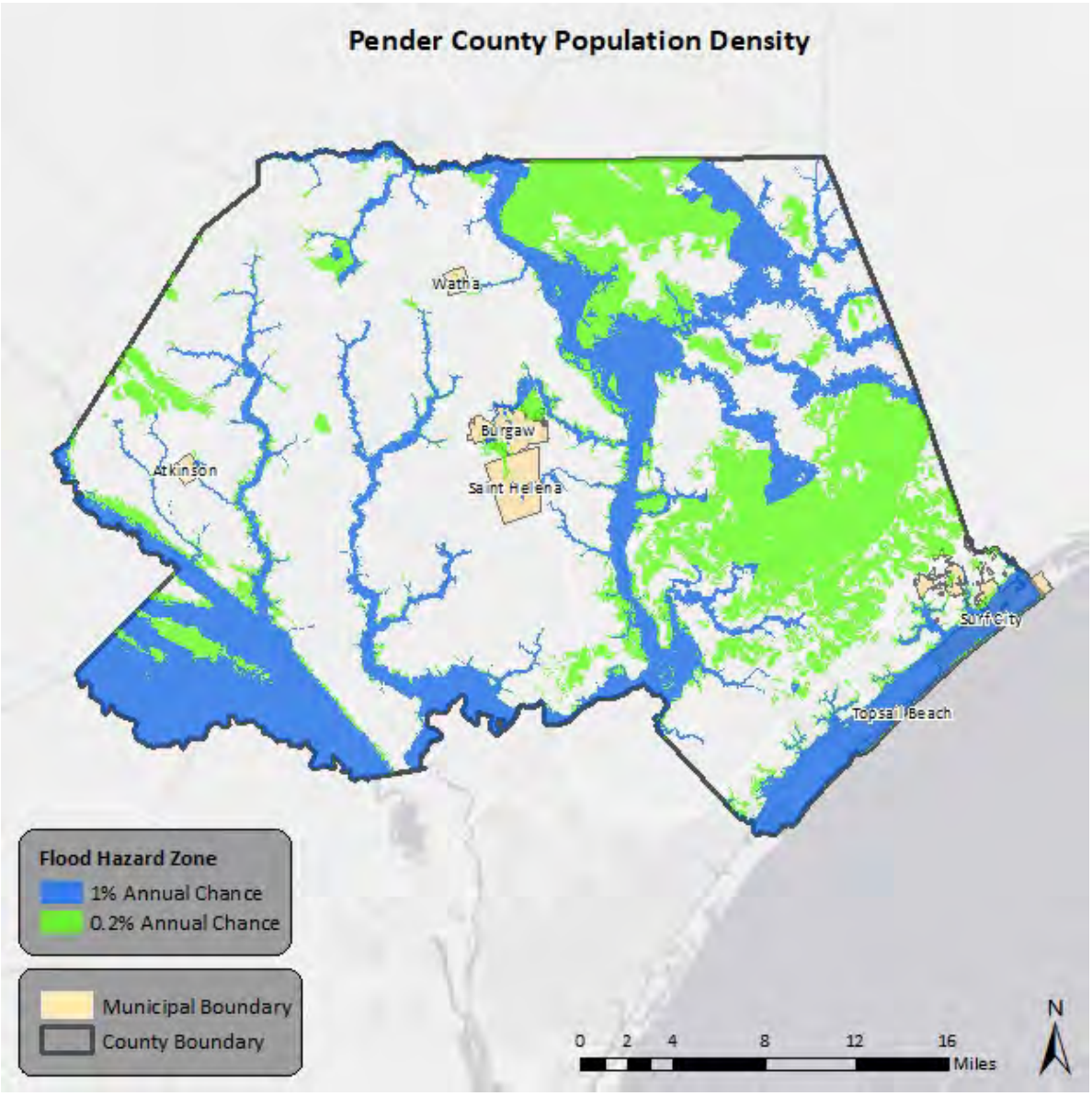


FIGURE 6.17: PENDER COUNTY FLOODPLAINS



CRITICAL FACILITIES

The critical facility analysis revealed that there are 78 critical facilities located in the Southeastern NC Region's 1.0-percent and 2.0-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. (As previously noted, this analysis does not consider building elevation, which may negate risk.). A list of specific critical facilities and their associated risk can be found in **Table 6.26** at the end of this section.

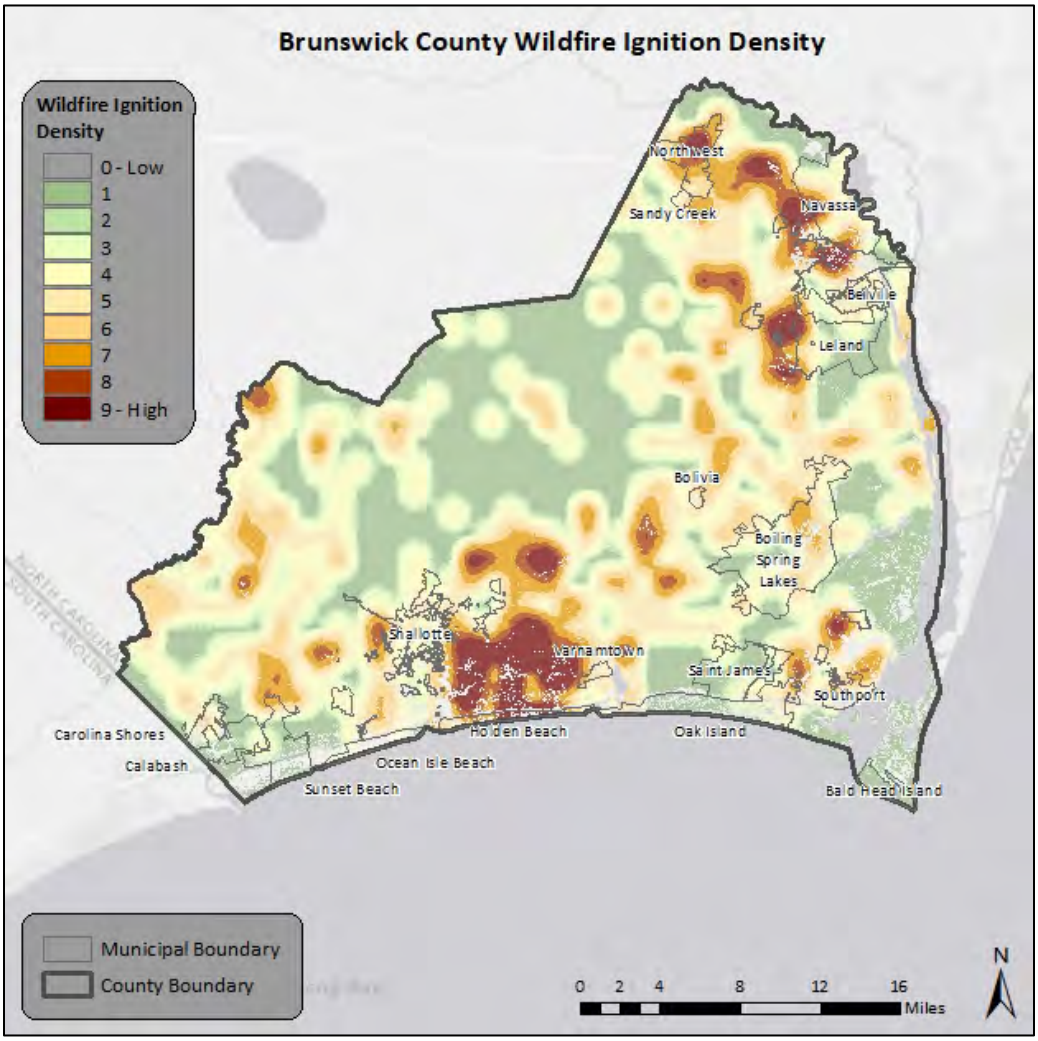
In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the Southeastern NC Region, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations

should be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

6.5.6 Wildfires

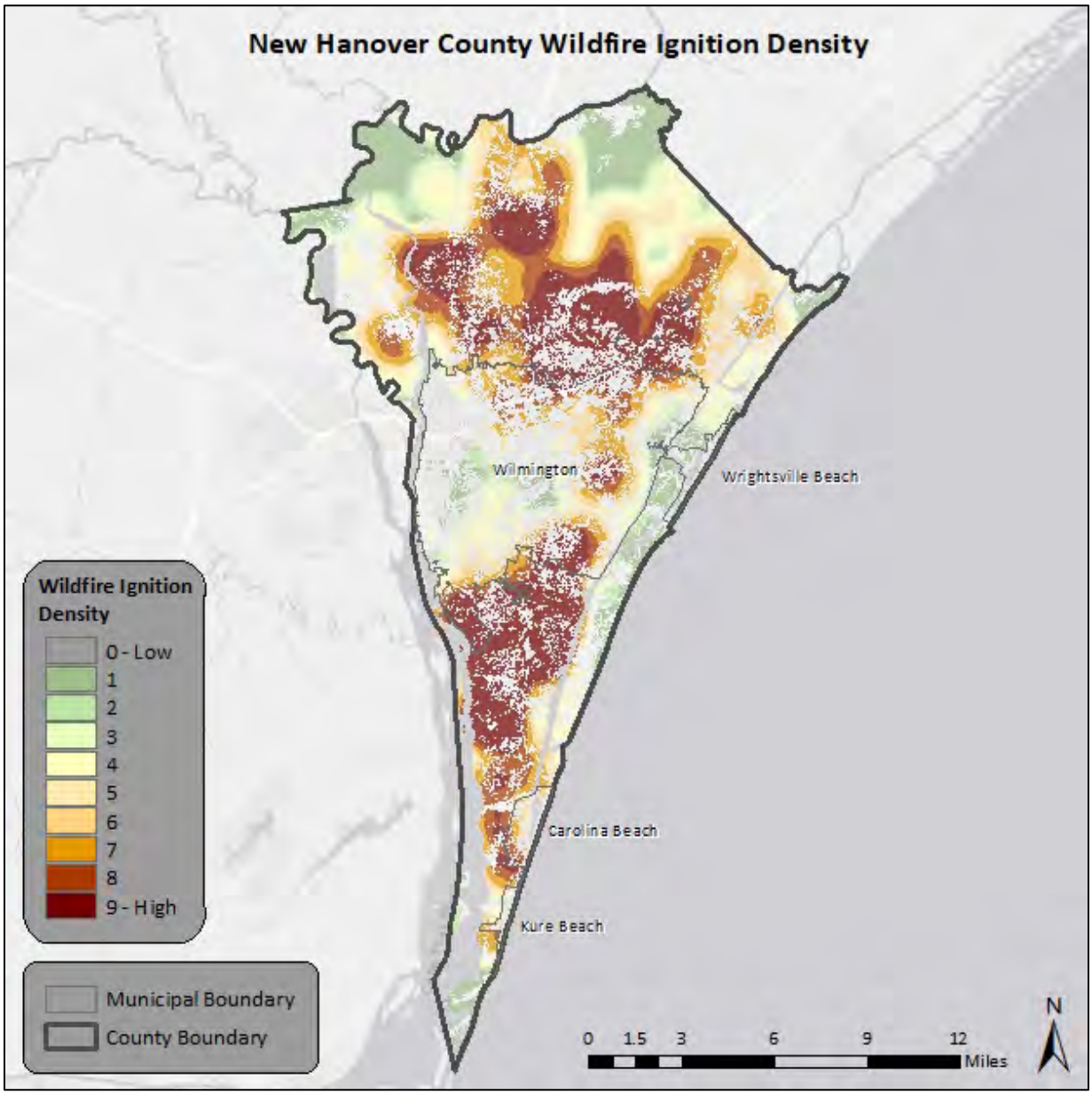
To estimate exposure to wildfire, the Wildland Urban Interface (WUI) Risk Index for the region was obtained through the Southern Wildfire Risk Assessment. The WUI uses a Response Function modeling approach and rates the potential impact of a wildfire on people and their homes. The index ranges from -1 to -9, with -9 being the most negative impact. For example, an area with high housing density and high flame lengths are rated -9, while an area with low housing density and low flame lengths are rated -1. At-risk areas fall within the range of -7 to -9. This index was layered with parcel data using GIS analysis. **Figures 6.18-6.21** show the Wildfire Ignition Density for each county in the region below.

FIGURE 6.18: WILDFIRE IGNITION DENSITY IN BRUNSWICK COUNTY



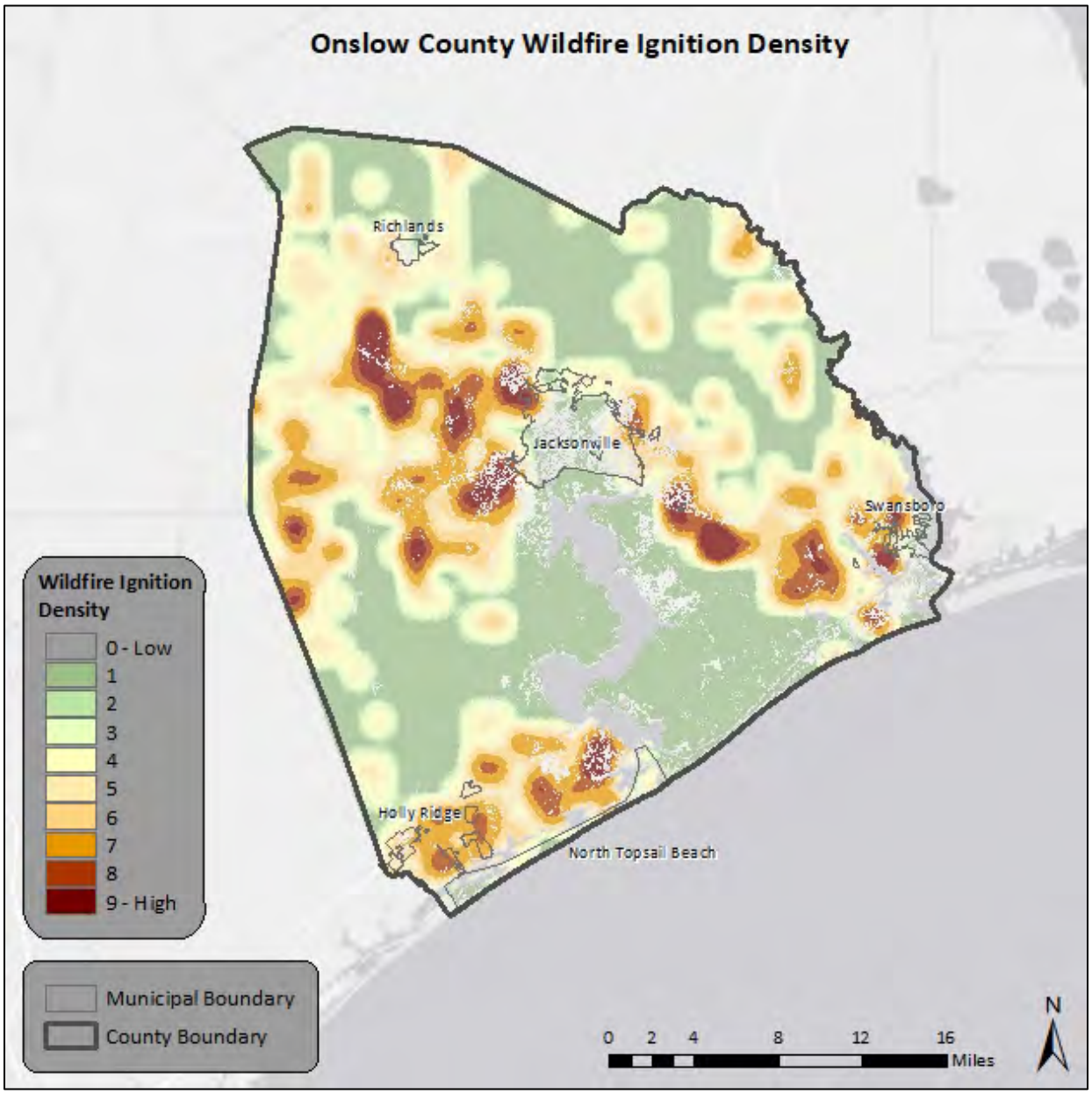
Source: Southern Wildfire Risk Assessment

FIGURE 6.19: WILDFIRE IGNITION DENSITY IN NEW HANOVER COUNTY



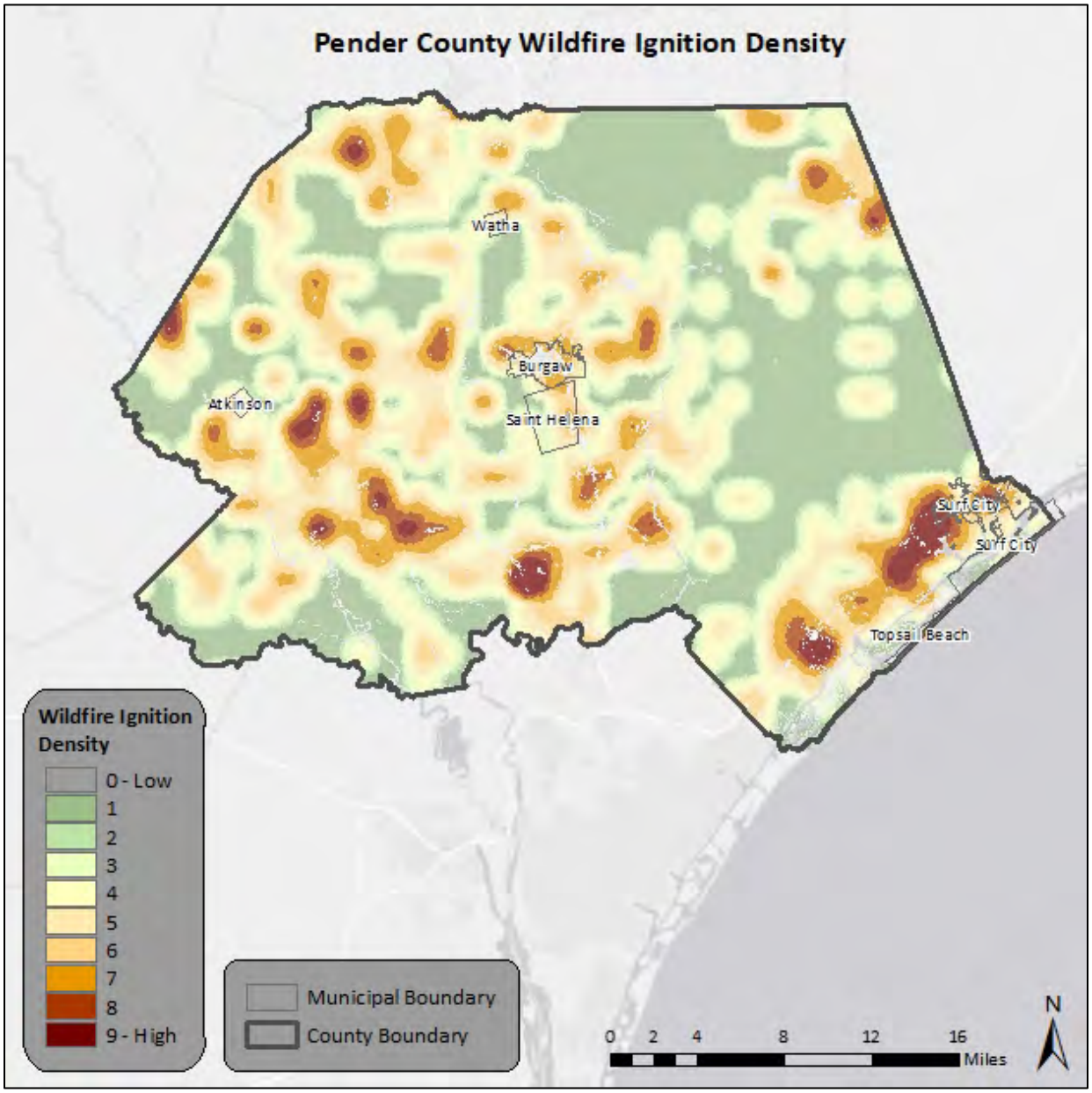
Source: Southern Wildfire Risk Assessment

FIGURE 6.20: WILDFIRE IGNITION DENSITY IN ONSLOW COUNTY



Source: Southern Wildfire Risk Assessment

FIGURE 6.21: WILDFIRE IGNITION DENSITY IN PENDER COUNTY



Source: Southern Wildfire Risk Assessment

The region contains some lands where the value falls into the at-risk category, though the region has somewhat less land labeled as at-risk compared to other regions of North Carolina. Overall, there is likely considerably less risk in this region than in other areas of the country.

SOCIAL VULNERABILITY

Even though not all areas have equal vulnerability, there is some susceptibility across the entire Southeastern NC Region. It is assumed that the total population is at risk to the wildfire hazard. Determining the exact number of people in certain wildfire zones is difficult with existing data and could be misleading.

CRITICAL FACILITIES

All of the counties in the Southeastern NC Region have critical facilities in the at-risk area (-7 or higher) for wildfires. New Hanover had the most with 104, and Pender had the least with 36. This data reflects a slightly elevated risk in New Hanover County for critical facilities to wildfires.

Table 6.19 shows the results of the GIS analysis.

TABLE 6.19: CRITICAL FACILITIES IN THE AT-RISK WUI RISK INDEX AREA

Location	Number of At-Risk Critical Facilities
Brunswick County	55
New Hanover County	104
Onslow County	99
Pender County	36
Southeastern NC Regional Total	**294**

Source: Southern Wildfire Risk Assessment, Local governments

Additional information was provided through the NCEM Risk Management Tool (RMT). This data describes vulnerability in both built and living environments and can be seen in below in **Table 6.20** and **Table 6.21**.

TABLE 6.20: BUILDING VULNERABILITY TO WILDFIRE HAZARDS IN THE SOUTHEASTERN NC REGION

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Brunswick County	**16,798**	**44,075**	**$4,746,767,141**	**2,297**	**$1,158,179,367**	**541**	**$488,324,254**	**46,913**	**$6,393,270,764**
Bald Head Island	-	15	$8,626,244	2	$151,151	-	$0	17	$8,777,395
Belville	187	750	$100,230,667	26	$13,890,788	2	$816,357	778	$114,937,813
Boiling Spring Lakes	639	1,824	$194,148,625	33	$8,172,694	31	$29,784,134	1,888	$232,105,454
Bolivia	227	203	$18,487,612	15	$3,390,865	13	$9,880,048	231	$31,758,525
Calabash	65	217	$23,374,621	9	$4,421,898	2	$2,247,858	228	$30,044,377
Carolina Shores	415	1,274	$155,441,030	40	$18,820,389	2	$1,088,930	1,316	$175,350,349
Holden Beach	144	1,057	$194,284,718	7	$3,930,592	3	$2,261,760	1,067	$200,477,069
Leland	930	2,370	$268,102,240	114	$47,642,188	44	$41,406,079	2,528	$357,150,507
Navassa	370	589	$37,171,810	43	$12,878,696	18	$4,755,933	650	$54,806,439
Northwest	263	423	$32,411,538	19	$4,026,982	11	$3,380,772	453	$39,819,292
Oak Island	843	2,695	$304,286,210	121	$36,840,718	26	$11,122,487	2,842	$352,249,415
Ocean Isle Beach	92	769	$127,966,753	37	$14,071,396	3	$1,479,535	809	$143,517,685
Sandy Creek	138	130	$7,620,531	10	$1,589,721	2	$205,620	142	$9,415,872
Shallotte	728	1,466	$209,821,998	284	$183,581,206	82	$69,730,404	1,832	$463,133,608
Southport	488	1,163	$193,326,468	127	$137,662,208	10	$9,644,812	1,300	$340,633,489

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
St. James	-	940	$331,949,030	16	$9,350,557	-	$0	956	$341,299,587
Sunset Beach	11	1,063	$209,682,848	44	$61,884,877	3	$388,974	1,110	$271,956,699
Varnamtown	198	314	$31,019,143	12	$4,249,907	6	$2,897,670	332	$38,166,719
Unincorporated Area	11,060	26,813	$2,298,815,055	1,338	$591,622,534	283	$297,232,881	28,434	$3,187,670,470
New Hanover County	**16,425**	**50,226**	**$13,102,945,064**	**2,448**	**$4,121,898,254**	**361**	**$785,692,231**	**53,035**	**$18,010,535,548**
Carolina Beach	798	2,333	$790,550,725	67	$66,388,178	18	$26,458,555	2,418	$883,397,458
Kure Beach	114	726	$356,079,831	10	$11,180,615	2	$2,756,361	738	$370,016,807
Wilmington	7,268	17,264	$5,061,926,000	853	$1,961,445,283	201	$494,565,397	18,318	$7,517,936,680
Wrightsville	-	-	$0	-	$0	-	$0	-	$0
Unincorporated Area	8,245	29,903	$6,894,388,508	1,518	$2,082,884,178	140	$261,911,918	31,561	$9,239,184,603
Onslow County	**28,234**	**49,392**	**$4,920,045,660**	**2,155**	**$1,664,710,592**	**1,542**	**$1,896,072,911**	**53,089**	**$8,480,829,164**
Holly Ridge	757	714	$53,468,296	77	$47,647,688	18	$16,797,629	809	$117,913,613
Jacksonville	7,312	11,754	$1,492,374,793	513	$904,465,424	1,097	$1,143,741,407	13,364	$3,540,581,624
North Topsail Beach	255	756	$151,687,226	3	$948,608	2	$1,265,420	761	$153,901,255
Richlands	529	709	$85,885,368	59	$47,204,752	26	$45,543,103	794	$178,633,223
Swansboro	355	1,096	$122,124,318	111	$93,607,710	35	$119,793,055	1,242	$335,525,083
Unincorporated Area	19,026	34,363	$3,014,505,659	1,392	$570,836,410	364	$568,932,297	36,119	$4,154,274,366
Pender County	**7,022**	**22,296**	**$2,269,492,302**	**2,676**	**$699,150,244**	**297**	**$274,277,880**	**25,269**	**$3,242,920,427**
Atkinson	94	80	$7,262,907	14	$2,084,462	6	$2,648,726	100	$11,996,094
Burgaw	579	757	$98,553,462	110	$101,862,803	19	$17,111,547	886	$217,527,812
St. Helena	97	172	$19,186,324	43	$4,039,880	7	$2,354,466	222	$25,580,671
Surf City	84	621	$61,303,232	57	$36,763,610	8	$2,365,403	686	$100,432,245
Topsail Beach	-	-	$0	-	$0	-	$0	-	$0
Watha	96	164	$14,273,499	17	$2,816,343	10	$3,627,807	191	$20,717,649
Unincorporated Area	6,072	20,502	$2,068,912,878	2,435	$551,583,146	247	$246,169,931	23,184	$2,866,665,956
Southeastern NC Regional Total	**68,479**	**165,989**	**$25,039,250,167**	**9,576**	**$7,643,938,457**	**2,741**	**$3,444,367,276**	**178,306**	**$36,127,555,903**

Source: NCEM Risk Management Tool

TABLE 6.21: POPULATION VULNERABILITY TO WILDFIRE HAZARD FOR THE SOUTHEASTERN NC REGION

Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Brunswick County	**18,534**	**4,690**	**86,465**
Bald Head Island	-	-	2
Belville	402	102	1,875
Boiling Spring Lakes	1,113	281	5,191
Bolivia	65	16	303
Calabash	80	20	375
Carolina Shores	745	189	3,478
Holden Beach	59	15	275
Leland	2,461	623	11,480
Navassa	310	78	1,445
Northwest	170	43	791
Oak Island	531	134	2,476
Ocean Isle Beach	88	22	411
Sandy Creek	54	13	252
Shallotte	1,019	258	4,753
Southport	581	147	2,711
St. James	473	120	2,207
Sunset Beach	231	59	1,080
Varnamtown	103	26	482
Unincorporated Area	10,049	2,544	46,878
New Hanover County	**17,153**	**7,159**	**123,756**
Carolina Beach	518	216	3,737
Kure Beach	118	49	850
Wilmington	6,819	2,846	49,195
Wrightsville	-	-	-
Unincorporated Area	9,698	4,048	69,974
Onslow County	**9,839**	**12,608**	**131,894**
Holly Ridge	114	146	1,525
Jacksonville	3,870	4,959	51,876
North Topsail Beach	24	31	326
Richlands	115	148	1,544
Swansboro	170	218	2,278
Unincorporated Area	5,546	7,106	74,345
Pender County	**6,543**	**2,545**	**43,280**
Atkinson	22	8	144
Burgaw	355	138	2,345
St. Helena	47	18	311
Surf City	52	24	373
Topsail Beach	-	-	-
Watha	47	18	307
Unincorporated Area	6,020	2,339	39,800

Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Southeastern NC Regional Total	52,069	27,002	385,395

Source: NCEM Risk Management Tool

6.5.7 Hazardous Substances

Most hazardous substance incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous substance incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels[4]. In both scenarios, two sizes of buffers—0.5 mile and 1 mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the Southeastern NC Region, along with buffers, were used for analysis as shown in **Figure 6.10.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure 6.11** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels, improved value, as shown in **Table 6.22** (fixed sites), **Table 6.23** (mobile road sites) and **Table 6.24** (mobile railroad sites)[5].

[4] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).

[5] Note that parcels included in the 1-mile analysis are also included in the 0.5-mile analysis.

FIGURE 6.10: TOXIC RELEASE INVENTORY (TRI) FACILITIES

Source: EPA

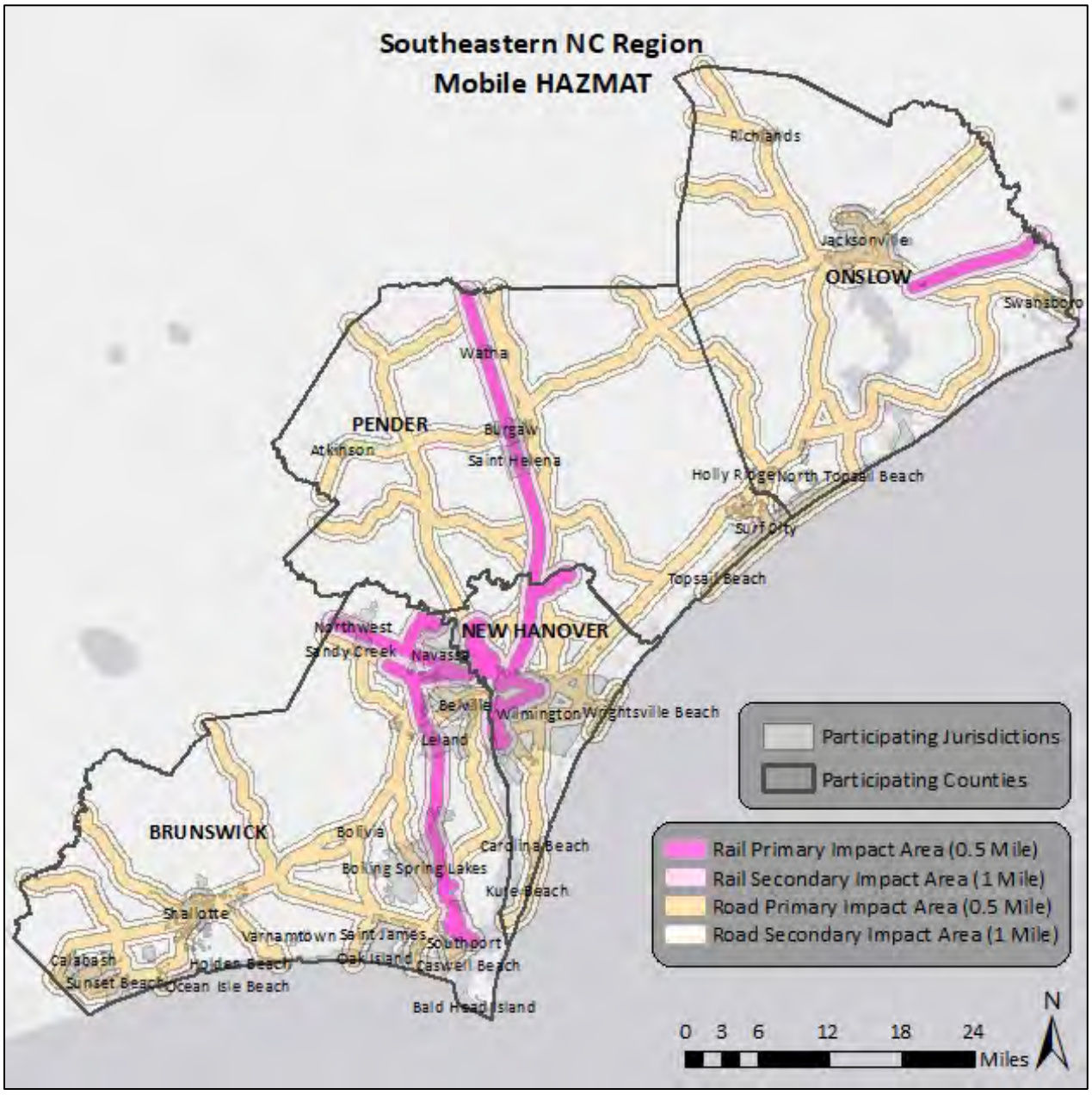
TABLE 6.22: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (FIXED SITES) IN THE SOUTHEASTERN NC REGION

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Brunswick County	**1,528**	**1,077**	**$286,270,230**	**5,616**	**3,961**	**$1,023,012,995**
Bald Head Island	-	-	-	-	-	-
Belville	2	2	$991,170	397	367	$61,502,920
Boiling Spring Lakes	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-
Calabash	-	-	-	-	-	-

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Carolina Shores	-	-	-	-	-	-
Holden Beach	-	-	-	-	-	-
Leland	633	544	$79,856,670	2,382	1,840	$368,007,895
Navassa	29	14	$11,208,760	153	75	$16,777,900
Northwest	-	-	-	-	-	-
Oak Island	-	-	-	-	-	-
Ocean Isle Beach	-	-	-	-	-	-
Sandy Creek	-	-	-	-	-	-
Shallotte	-	-	-	-	-	-
Southport	333	208	$68,509,000	1,215	783	$212,326,640
St. James	-	-	-	-	-	-
Sunset Beach	-	-	-	-	-	-
Varnamtown	-	-	-	-	-	-
Unincorporated Area	531	311	$125,704,630	**1,469**	**896**	**$364,397,640**
New Hanover County	**2,539**	**2,154**	**$592,683,919**	**8,202**	**6,779**	**$1,707,880,901**
Carolina Beach	-	-	-	-	-	-
Kure Beach	-	-	-	-	-	-
Wilmington	1,921	1,699	$327,460,561	4,982	4,315	$1,082,159,434
Wrightsville	-	-	-	-	-	-
Unincorporated Area	618	455	$265,223,358	3,220	2,464	$625,721,467
Onslow County	**1,654**	**1,207**	**$190,390,033**	**5,456**	**4,393**	**$616,993,861**
Holly Ridge	339	174	$22,846,964	878	545	$49,037,674
Jacksonville	1,233	990	$152,353,698	3,960	3,430	$516,334,295
North Topsail Beach	-	-	-	-	-	-
Richlands	-	-	-	-	-	-
Swansboro	-	-	-	-	-	-
Unincorporated Area	82	43	$15,189,371	618	418	$51,621,892
Pender County	**369**	**298**	**$42,843,385**	**693**	**572**	**$98,607,183**
Atkinson	-	-	-	-	-	-
Burgaw	-	-	-	-	-	-
St. Helena	-	-	-	-	-	-
Surf City	-	-	-	-	-	-
Topsail Beach	-	-	-	-	-	-
Watha	-	-	-	-	-	-
Unincorporated Area	369	298	$42,843,385	693	572	$98,607,183
Southeastern NC Regional Total	**6,090**	**4,736**	**$1,112,187,567**	**19,967**	**15,705**	**$3,446,494,940**

Source: EPA, Local governments

FIGURE 6.9: MOBILE HAZMAT BUFFERS IN THE SOUTHEASTERN NC REGION



Source: NC Department of Transportation

TABLE 6.23: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (MOBILE ANALYSIS – ROAD)

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Brunswick County	**53,609**	**32,796**	**$5,779,007,619**	**86,671**	**52,685**	**$9,318,373,486**
Bald Head Island	-	-	$-	-	-	$ -
Belville	495	401	$82,058,310	889	782	$132,514,260

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Boiling Spring Lakes	1,965	458	$93,619,390	4,710	1,235	$188,439,340
Bolivia	118	76	$15,699,590	118	76	$15,699,590
Calabash	1,857	1,048	$120,808,690	2,214	1,300	$147,009,570
Carolina Shores	1,819	1,451	$230,782,590	3,086	2,512	$395,848,340
Holden Beach	499	380	$101,544,560	1,208	884	$205,354,923
Leland	4,872	3,781	$735,481,195	8,760	6,743	$1,326,415,645
Navassa	127	46	$12,759,850	380	201	$27,413,160
Northwest	45	29	$2,077,670	89	59	$4,657,150
Oak Island	2,866	2,274	$382,313,189	5,292	4,184	$671,747,029
Ocean Isle Beach	977	716	$176,188,450	1,955	1,602	$428,216,576
Sandy Creek	109	80	$6,488,930	135	98	$7,744,860
Shallotte	1,686	1,019	$289,461,820	2,494	1,447	$378,257,800
Southport	2,796	1,989	$483,605,700	2,910	2,038	$499,982,720
St. James	550	229	$85,641,320	1,752	975	$392,097,760
Sunset Beach	2,747	2,175	$384,922,856	1,752	975	$392,097,760
Varnamtown	-	-	$-	-	-	$ -
Unincorporated Area	30,081	16,644	$2,575,553,509	48,927	27,574	$4,104,877,003
New Hanover County	**57,427**	**47,986**	**$11,871,779,279**	**80,892**	**68,868**	**$16,021,996,577**
Carolina Beach	3,086	2,389	$460,211,893	3,855	2,977	$580,361,293
Kure Beach	2,065	1,667	$360,437,300	2,065	1,667	$360,437,300
Wilmington	27,907	24,358	$6,763,654,862	36,634	32,357	$8,737,707,009
Wrightsville	1,883	1,544	$488,540,800	1,883	1,544	$488,540,800
Unincorporated Area	22,486	18,028	$3,798,934,424	36,455	30,323	$5,854,950,175
Onslow County	**28,239**	**21,297**	**$3,378,893,315**	**43,728**	**33,898**	**$4,804,450,606**
Holly Ridge	1,714	1,286	$156,565,174	1,833	1,367	$171,388,964
Jacksonville	8,207	7,132	$1,464,090,985	13,501	12,164	$2,066,767,138
North Topsail Beach	1,731	1,197	$250,926,670	1,782	1,221	$259,043,610
Richlands	670	529	$63,775,651	826	656	$81,415,958
Swansboro	1,194	1,074	$141,659,708	1,453	1,311	$182,373,488
Unincorporated Area	14,723	10,079	$1,301,875,127	24,333	17,179	$2,043,461,448
Pender County	**25,115**	**15,974**	**$2,169,845,917**	**33,763**	**21,190**	**$2,795,149,758**
Atkinson	325	184	$11,518,718	325	184	$11,518,718
Burgaw	1,822	1,247	$230,619,363	1,916	1,302	$237,162,974
St. Helena	213	133	$14,817,395	277	154	$16,816,935
Surf City	4,942	3,991	$609,105,738	5,196	4,192	$637,444,836
Topsail Beach	1,836	1,489	$252,206,350	1,852	1,505	$255,021,882
Watha	-	-	$ -	27	11	$452,713
Unincorporated Area	15,977	8,930	$1,051,578,353	24,170	13,842	$1,636,731,700
Southeastern NC Regional Total	**164,390**	**118,053**	**$23,199,526,130**	**245,054**	**176,641**	**$32,939,970,427**

Source: NC Department of Transportation, Local Governments

TABLE 6.24: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (MOBILE ANALYSIS – RAILROAD)

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Brunswick County	**9,616**	**5,128**	**$833,416,590**	**18,789**	**10,269**	**$1,829,100,400**
Bald Head Island	-	-	$-	-	-	$-
Belville	-	-	$-	-	-	$-
Boiling Spring Lakes	2,944	1,460	$170,926,720	4,863	2,116	$298,498,350
Bolivia	-	-	$-	-	-	$-
Calabash	-	-	$-	-	-	$-
Carolina Shores	-	-	$-	-	-	$-
Holden Beach	-	-	$-	-	-	$-
Leland	2,153	1,261	$249,791,510	4,946	3,407	$661,123,410
Navassa	696	436	$40,516,040	854	511	$54,781,030
Northwest	276	144	$9,646,430	456	241	$16,379,510
Oak Island	-	-	$-	-	-	$-
Ocean Isle Beach	-	-	$-	-	-	$-
Sandy Creek	-	-	$-	-	-	$-
Shallotte	-	-	$-	-	-	$-
Southport	92	45	$17,606,740	834	583	$153,900,500
St. James	-	-	$-	-	-	$-
Sunset Beach	-	-	$-	-	-	$-
Varnamtown	-	-	$-	-	-	$-
Unincorporated Area	3,455	1,782	$344,929,150	6,836	3,411	$644,417,600
New Hanover County	**13,194**	**10,548**	**$2,579,800,792**	**21,234**	**17,425**	**$4,353,496,599**
Carolina Beach	-	-	$-	-	-	$-
Kure Beach	-	-	$-	-	-	$-
Wilmington	10,518	8,659	$ 2,062,401,909	16,584	14,050	$3,602,710,348
Wrightsville	-	-	$-	-	-	$-
Unincorporated Area	2,676	1,889	$517,398,883	4,650	3,375	$750,786,251
Onslow County	**1,160**	**712**	**$53,964,473**	**2,424**	**1,677**	**$133,989,077**
Holly Ridge	-	-	$-	-	-	$-
Jacksonville	12	7	$2,949,643	12	7	$2,949,643
North Topsail Beach	-	-	$-	-	-	$-
Richlands	-	-	$-	-	-	$-
Swansboro	-	-	$-	-	-	$-
Unincorporated Area	1,148	705	$51,014,830	2,412	1,670	$131,039,434
Pender County	**3,339**	**2,053**	**$264,746,986**	**5,720**	**3,461**	**$431,125,507**
Atkinson	-	-	$-	-	-	$-
Burgaw	1,137	751	$134,824,835	1,712	1,143	$203,780,414
St. Helena	199	96	$9,699,715	349	194	$19,587,511
Surf City	-	-	$-	-	-	$-

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Topsail Beach	-	-	$-	-	-	$-
Watha	161	93	$5,684,181	161	93	$5,684,181
Unincorporated Area	1,842	1,113	$114,538,255	3,498	2,031	$202,073,401
Southeastern NC Regional Total	**27,309**	**18,441**	**$3,731,928,841**	**48,167**	**32,832**	**$6,747,711,583**

Source: NC Department of Transportation, Local Governments

SOCIAL VULNERABILITY

Given high susceptibility across the entire Southeastern NC Region, it is assumed that the total population is at risk to hazardous materials incidents. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

CRITICAL FACILITIES

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 70 facilities located in a HAZMAT risk zone. The primary impact zone (0.5-mile buffer) includes 19 facilities throughout the region. Onslow County has the most facilities in the primary impact zone with 10 facilities, New Hanover has 9, while Brunswick and Pender County have none. A list of specific critical facilities and their associated risk can be found in **Table 6.26** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors revealed that there are 504 critical facilities located in the primary (0.5 mile) mobile HAZMAT buffer areas for roads and railroads throughout the region. Although this is a worst-case scenario model, it indicates that most of the critical facilities in the Southeastern NC region are vulnerable to a potential mobile HAZMAT incident. Additionally, there are 601 critical facilities located in the secondary (1 mile) buffer area of both roads and railroads, accounting for over 85 percent of the total number of critical facilities in the region. This may be the result of many critical facilities being located near major roadways for ease of access, but it is nonetheless important to recognize what a large percentage of critical facilities in the region are located in the smaller buffer area. A list of specific critical facilities and their associated risk can be found in **Table 6.26** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the Southeastern NC Region. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc.

6.6 CONCLUSIONS ON HAZARD VULNERABILITY

The results of this vulnerability assessment are useful in at least three ways:

- Improving our understanding of the risk associated with the natural hazards in the Southeastern NC region through better understanding of the complexities and dynamics of risk, how levels of risk can be measured and compared, and the myriad of factors that influence risk. An understanding of these relationships is critical in making balanced and informed decisions on managing the risk.
- Providing a baseline for policy development and comparison of mitigation alternatives. The data used for this analysis presents a current picture of risk in the Southeastern NC Region. Updating this risk "snapshot" with future data will enable comparison of the changes in risk with time. Baselines of this type can support the objective analysis of policy and program options for risk reduction in the region.
- Comparing the risk among the natural hazards addressed. The ability to quantify the risk to all these hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate natural hazards that are present in the Southeastern NC Region. This final step in the risk assessment provides the necessary information for local officials to craft a mitigation strategy to focus resources on only those hazards that pose the most threat to the Southeastern NC counties.

Exposure to hazards can be an indicator of vulnerability. Economic exposure can be identified through locally assessed values for improvements (buildings), and social exposure can be identified by estimating the population exposed to each hazard. This information is especially important for decision-makers to use in planning for evacuation or other public safety related needs.

The types of assets included in these analyses include all building types in the participating jurisdictions. Specific information about the types of assets that are vulnerable to the identified hazards is included in each hazard subsection (for example, all building types are considered at risk to the winter storm hazard and commercial, residential, and government owned facilities are at risk to repetitive flooding, etc).

Table 6.25 presents a summary of potential annualized loss estimates for each hazard in the Southeastern NC Region. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level and/or through modeling techniques described at the beginning of this section. If no historical occurrences were reported, or if modeling has not been conducted for a particular hazard, an accurate annualized loss estimate could not be obtained. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the region.

TABLE 6.25: POTENTIAL ANNUALIZED LOSSES FOR THE SOUTHEASTERN NC REGION

Hazard	Brunswick County	New Hanover County	Onslow County	Pender County	Total
Drought	Negligible	Negligible	Negligible	Negligible	Negligible
Excessive Heat	Negligible	Negligible	Negligible	Negligible	Negligible
Hurricane and Coastal Hazards	$53,436,605	$167,594,285	$90,454,925	$19,447,689	$330,933,504
Tornadoes/Thunderstorms	$1,284,177	Negligible	$18,982	$416,457	$1,719,616
Severe Winter Weather	Negligible	Negligible	Negligible	Negligible	Negligible
Earthquakes	Negligible	Negligible	Negligible	Negligible	Negligible
Geological	Negligible	Negligible	Negligible	Negligible	Negligible
Dam Failure	Negligible	Negligible	Negligible	Negligible	Negligible
Flooding	$791,848	$2,319,798	$216,407	$233,189	$3,561,242
Wildfires	Negligible	Negligible	Negligible	Negligible	Negligible
Infectious Disease	Negligible	Negligible	Negligible	Negligible	Negligible
Hazardous Substances	Negligible	Negligible	Negligible	Negligible	Negligible
Radiological Emergency	Negligible	Negligible	Negligible	Negligible	Negligible
Terrorism	Negligible	Negligible	Negligible	Negligible	Negligible
Cyber	Negligible	Negligible	Negligible	Negligible	Negligible
Electromagnetic Pulse	Negligible	Negligible	Negligible	Negligible	Negligible

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to natural hazards including drought, hurricane and coastal hazards, tornadoes/ thunderstorms, and severe winter weather. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table 6.26** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Brunswick County																		
Brunswick County Emergency Management	Other	X	X	X	X	X	X					X			X	X		
Bald Head Island Volunteer Fire and Rescue	EMS	X	X	X	X	X	X	X	X									
Bolivia Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X		
Brunswick County EMS	EMS	X	X	X	X	X	X					X			X	X		
Brunswick Co Regional Emergency Services Training and Operations Facilities HQ	EMS	X	X	X	X	X	X								X	X		
Calabash Fire Department Station 12-1 - HQ	EMS	X	X	X	X	X	X								X	X		
Calabash Fire Department Station 12-2	EMS	X	X	X	X	X	X					X						
Calabash Volunteer EMS	EMS	X	X	X	X	X	X								X	X		
Civietown Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X		
Coastline Rescue Squad	EMS	X	X	X	X	X	X					X			X	X		
Dak Americas Emergency Response Team	EMS	X	X	X	X	X	X										X	X
Grissettown - Longwood Fire and Rescue	EMS	X	X	X	X	X	X					X			X	X		
Leland Fire and Rescue	EMS	X	X	X	X	X	X					X				X		X
Navassa Volunteer Fire Department	EMS	X	X	X	X	X	X					X					X	X
Northwest Volunteer Fire Dept.	EMS	X	X	X	X	X	X										X	X
Oak Island Fire and Rescue Department	EMS	X	X	X	X	X	X								X	X		
Oak Island Fire and Rescue Dept. - Substation	EMS	X	X	X	X	X	X	X	X									
Oak Island Water Rescue Team	EMS	X	X	X	X	X	X	X	X									
Saint James Fire Department	EMS	X	X	X	X	X	X					X						
Shallotte Point Volunteer Fire Department	EMS	X	X	X	X	X	X					X						
Shallotte Rescue Squad	EMS	X	X	X	X	X	X		X			X			X	X		
Southport Rescue Squad	EMS	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Sunny Point Fire Department-DOD	EMS	X	X	X	X	X	X									X	X	X
Sunset Beach Fire Department	EMS	X	X	X	X	X	X								X	X		
Town Of Ocean Isle Beach Fire Department	EMS	X	X	X	X	X	X								X	X		
Town of Shallotte Fire Department Station 1	EMS	X	X	X	X	X	X					X			X	X		
Town of Shallotte Fire Department Station 2	EMS	X	X	X	X	X	X					X			X	X		
Town of Shallotte Fire Department Station 3	EMS	X	X	X	X	X	X								X	X		
Tri-Beach Volunteer Fire Dept. Station 1	EMS	X	X	X	X	X	X					X				X		
Tri-Beach Volunteer Fire Dept. Station 2	EMS	X	X	X	X	X	X	X	X									
Tri-Beach Volunteer Fire Dept. Station 3	EMS	X	X	X	X	X	X											
Waccamaw Volunteer Fire and Rescue	EMS	X	X	X	X	X	X								X	X		
Winnabow Volunteer Fire Department	EMS	X	X	X	X	X	X								X	X		
Bald Head Island Volunteer Fire and Rescue	Fire Stations	X	X	X	X	X	X	X	X									
Boiling Spring Lakes Volunteer Fire Dept. 1	Fire Stations	X	X	X	X	X	X					X			X	X		
Boiling Spring Lakes Volunteer Fire Dept. 2	Fire Stations	X	X	X	X	X	X					X						X
Boiling Spring Lakes Volunteer Fire Dept. 3	Fire Stations	X	X	X	X	X	X					X				X	X	X
Bolivia Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Calabash Fire Department Station 12-1 - HQ	Fire Stations	X	X	X	X	X	X								X	X		
Calabash Fire Department Station 12-2	Fire Stations	X	X	X	X	X	X					X						
Civietown Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Grissettown - Longwood Fire and Rescue	Fire Stations	X	X	X	X	X	X					X			X	X		
Leland Fire and Rescue	Fire Stations	X	X	X	X	X	X					X				X		X
Navassa Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X					X	X
Northwest Volunteer Fire and Rescue Dept.	Fire Stations	X	X	X	X	X	X										X	X
Oak Island Fire and Rescue Department	Fire Stations	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Oak Island Fire and Rescue Dept. - Substation	Fire Stations	X	X	X	X	X	X	X	X									
Progress Energy Brunswick Nuclear Power Plant	Fire Stations	X	X	X	X	X	X										X	X
Saint James Fire Department	Fire Stations	X	X	X	X	X	X					X						
Shallotte Point Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X						
Southport Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Sunny Point Fire Department-DOD	Fire Stations	X	X	X	X	X	X									X	X	X
Sunset Beach Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Sunset Harbor and Zion Hill Vol. Fire Dept.	Fire Stations	X	X	X	X	X	X		X			X						
Supply Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Town of Ocean Isle Beach Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Town of Shallotte Fire Department Station 1	Fire Stations	X	X	X	X	X	X					X			X	X		
Town of Shallotte Fire Department Station 2	Fire Stations	X	X	X	X	X	X					X			X	X		
Town of Shallotte Fire Department Station 3	Fire Stations	X	X	X	X	X	X								X	X		
Tri-Beach Volunteer Fire Dept. Station 1	Fire Stations	X	X	X	X	X	X					X				X		
Tri-Beach Volunteer Fire Dept. Station 2	Fire Stations	X	X	X	X	X	X	X	X									
Tri-Beach Volunteer Fire Dept. Station 3	Fire Stations	X	X	X	X	X	X											
Waccamaw Volunteer Fire and Rescue	Fire Stations	X	X	X	X	X	X								X	X		
Winnabow Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Boiling Spring Lakes Police Department	Law Enforcement	X	X	X	X	X	X					X			X	X		
Brunswick Community College Campus Police	Law Enforcement	X	X	X	X	X	X								X	X		
Brunswick County Sheriff's Department / Brunswick County Jail	Law Enforcement	X	X	X	X	X	X					X			X	X		
Caswell Beach Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
City of Bald Head Island Police Department	Law Enforcement	X	X	X	X	X	X	X	X									

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
City of Leland Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
City of Northwest Police Department	Law Enforcement	X	X	X	X	X	X										X	X
City of Oak Island Police Department	Law Enforcement	X	X	X	X	X	X		X									
City of Southport Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
Holden Beach Police Department	Law Enforcement	X	X	X	X	X	X	X	X						X	X		
Navassa Police Department	Law Enforcement	X	X	X	X	X	X										X	X
Ocean Isle Beach Police Department	Law Enforcement	X	X	X	X	X	X	X	X			X			X	X		
Shallotte Police Department	Law Enforcement	X	X	X	X	X	X					X			X	X		
Town of Sunset Beach Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
Assistedcare Home Health	Medical Facility	X	X	X	X	X	X								X	X		
Assistedcare, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
Austin Facility	Medical Facility	X	X	X	X	X	X					X			X	X		
Autumn Care of Shallotte	Medical Facility	X	X	X	X	X	X					X			X	X		
Brunswick Community Hospital	Medical Facility	X	X	X	X	X	X								X	X		
Brunswick County DSS	Medical Facility	X	X	X	X	X	X					X			X	X		
Brunswick Cove Nursing Center	Medical Facility	X	X	X	X	X	X					X			X	X		
Brunswick Interagency Program	Medical Facility	X	X	X	X	X	X							X	X	X		
C&R Precious Stone	Medical Facility	X	X	X	X	X	X								X	X		
Carolina Hospice and Palliative Care, LLLC.	Medical Facility	X	X	X	X	X	X								X	X		
Conley's Home Place	Medical Facility	X	X	X	X	X	X					X			X	X		
D&E Precious Stone	Medical Facility	X	X	X	X	X	X								X	X		
Eldo Family Care Home #1	Medical Facility	X	X	X	X	X	X		X			X			X	X		
Human Interactive Services Respite	Medical Facility	X	X	X	X	X	X					X		X		X		
Interim Health Care	Medical Facility	X	X	X	X	X	X	X	X						X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
J. Arthur Dosher Memorial Hospital	Medical Facility	X	X	X	X	X	X							X	X	X		
Liberty Home Care	Medical Facility	X	X	X	X	X	X								X	X		
Liberty Nursing Services, LLC	Medical Facility	X	X	X	X	X	X								X	X		
Life, Inc./Folly Street Group Home	Medical Facility	X	X	X	X	X	X					X			X	X		
Life, Inc./Lockwood Street Group Home	Medical Facility	X	X	X	X	X	X										X	X
Lower Cape Fear Hospice, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		
Mary And Tasha Home	Medical Facility	X	X	X	X	X	X								X	X		
McCray Home	Medical Facility	X	X	X	X	X	X					X				X		
My Brother's Keeper - Cornwallis	Medical Facility	X	X	X	X	X	X					X			X	X		
Ocean Trail Convalescent Center, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		
Palliative Care Center of Lower Cape Fear Hospice	Medical Facility	X	X	X	X	X	X					X			X	X		
Ramsey Facility	Medical Facility	X	X	X	X	X	X								X	X	X	X
Shallotte Assisted Living, Inc.	Medical Facility	X	X	X	X	X	X									X		
Shallotte Group Home	Medical Facility	X	X	X	X	X	X								X	X		
Smigiel Home	Medical Facility	X	X	X	X	X	X											
Smith Home	Medical Facility	X	X	X	X	X	X					X			X	X		
South Brunswick Counseling Services	Medical Facility	X	X	X	X	X	X	X	X						X	X		
Southeastern Mental Health	Medical Facility	X	X	X	X	X	X								X	X		
The Counseling Center	Medical Facility	X	X	X	X	X	X								X	X		
Well Care Health Services, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		
Wilmington Treatment Ctr-Outpatient Services Shallotte	Medical Facility	X	X	X	X	X	X		X						X	X		
Windsor R.T.P.	Medical Facility	X	X	X	X	X	X					X			X	X		
Belville Elementary	Public School	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Bolivia Elementary	Public School	X	X	X	X	X	X								X	X		
Brunswick County Academy	Public School	X	X	X	X	X	X								X	X		
Brunswick County Early College	Public School	X	X	X	X	X	X								X	X		
Cedar Grove Middle	Public School	X	X	X	X	X	X											
Charter Day School	Public School	X	X	X	X	X	X								X	X		
Jessie Mae Monroe Elementary	Public School	X	X	X	X	X	X					X				X		
Leland Middle	Public School	X	X	X	X	X	X								X	X		
Lincoln Elementary	Public School	X	X	X	X	X	X					X				X	X	X
North Brunswick High	Public School	X	X	X	X	X	X								X	X		
Shallotte Middle	Public School	X	X	X	X	X	X								X	X		
South Brunswick High	Public School	X	X	X	X	X	X									X		X
South Brunswick Middle	Public School	X	X	X	X	X	X								X	X		
Southport Elementary	Public School	X	X	X	X	X	X					X				X		
Supply Elementary	Public School	X	X	X	X	X	X								X	X		
Town Creek Elementary	Public School	X	X	X	X	X	X								X	X		
Union Elementary	Public School	X	X	X	X	X	X					X			X	X		
Virginia Williamson Elem	Public School	X	X	X	X	X	X					X			X	X		
Waccamaw	Public School	X	X	X	X	X	X								X	X		
West Brunswick High	Public School	X	X	X	X	X	X								X	X		
New Hanover County																		
New Hanover County Emergency Management	Other	X	X	X	X	X	X								X	X	X	X
Castle Hayne Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X	X	X
Federal Point Fire and Rescue	EMS	X	X	X	X	X	X					X			X	X		
General Electric Company	EMS	X	X	X	X	X	X						X	X	X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Invista Emergency Medical Technician	EMS	X	X	X	X	X	X						X	X	X	X	X	X
Kure Beach Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X		
Myrtle Grove Volunteer Fire Department	EMS	X	X	X	X	X	X								X	X		
New Hanover Regional EMS - Airlink Station	EMS	X	X	X	X	X	X									X		X
New Hanover Regional EMS Station 1	EMS	X	X	X	X	X	X					X			X	X		
New Hanover Regional EMS Station 2	EMS	X	X	X	X	X	X								X	X	X	X
Ogden Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 1 - HQ	EMS	X	X	X	X	X	X								X	X		X
Wilmington Fire Department Station 10	EMS	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 11	EMS	X	X	X	X	X	X		X									
Wilmington Fire Department Station 2	EMS	X	X	X	X	X	X					X			X	X		X
Wilmington Fire Department Station 3	EMS	X	X	X	X	X	X								X	X	X	X
Wilmington Fire Department Station 4	EMS	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 5	EMS	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 6	EMS	X	X	X	X	X	X								X	X		
Wilmington Fire Department Station 7	EMS	X	X	X	X	X	X								X	X		
Wilmington Fire Department Station 8	EMS	X	X	X	X	X	X					X		X	X	X		
Wilmington Fire Department Station 9	EMS	X	X	X	X	X	X					X			X	X		
Wilmington Int. Airport Rescue Base	EMS	X	X	X	X	X	X									X		X
Wrightsboro Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X	X	X
Wrightsville Beach Fire Department	EMS	X	X	X	X	X	X	X	X						X	X		
Carolina Beach Fire Department	Fire Stations	X	X	X	X	X	X									X		
Castle Hayne Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X	X	X
Federal Point Fire and Rescue	Fire Stations	X	X	X	X	X	X					X			X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
General Electric Company	Fire Stations	X	X	X	X	X	X						X	X	X	X		
Kure Beach Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Myrtle Grove Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
NC Div. Of Forest Resources District 8	Fire Stations	X	X	X	X	X	X									X	X	X
Ogden Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 1 - HQ	Fire Stations	X	X	X	X	X	X								X	X		X
Wilmington Fire Department Station 10	Fire Stations	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 11	Fire Stations	X	X	X	X	X	X		X									
Wilmington Fire Department Station 2	Fire Stations	X	X	X	X	X	X					X			X	X		X
Wilmington Fire Department Station 3	Fire Stations	X	X	X	X	X	X								X	X	X	X
Wilmington Fire Department Station 4	Fire Stations	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 5	Fire Stations	X	X	X	X	X	X					X			X	X		
Wilmington Fire Department Station 6	Fire Stations	X	X	X	X	X	X								X	X		
Wilmington Fire Department Station 7	Fire Stations	X	X	X	X	X	X								X	X		
Wilmington Fire Department Station 8	Fire Stations	X	X	X	X	X	X					X		X	X	X		
Wilmington Fire Department Station 9	Fire Stations	X	X	X	X	X	X					X			X	X		
Wilmington International Airport Rescue Base	Fire Stations	X	X	X	X	X	X									X		X
Wrightsboro Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X	X	X
Wrightsville Beach Fire Department	Fire Stations	X	X	X	X	X	X	X	X						X	X		
Alcoholic Beverage Control Law Enforcement - District III Office	Law Enforcement	X	X	X	X	X	X								X	X	X	X
Bureau of Alcohol Tobacco Firearms and Explosives - Wilmington Field Office	Law Enforcement	X	X	X	X	X	X									X	X	X
Carolina Beach Police Department	Law Enforcement	X	X	X	X	X	X								X	X		

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Kure Beach Police Department	Law Enforcement	X	X	X	X	X	X					X			X	X		
New Hanover County Sheriff - Narcotics Vice Squad and Detective Unit	Law Enforcement	X	X	X	X	X	X								X	X	X	X
New Hanover County Sheriff's Office- Patrol Division	Law Enforcement	X	X	X	X	X	X								X	X	X	X
New Hanover Sheriff's Office / New Hanover County Detention Center	Law Enforcement	X	X	X	X	X	X					X				X	X	X
NC Division of Parks - Carolina Beach State Park	Law Enforcement	X	X	X	X	X	X								X	X		
NC Division of Parks - Fort Fisher	Law Enforcement	X	X	X	X	X	X	X	X						X	X		
NC State Highway Patrol Troop B District Vi	Law Enforcement	X	X	X	X	X	X								X	X		
NC State Ports Authority - Wilmington Police Department	Law Enforcement	X	X	X	X	X	X						X	X		X	X	X
US Customs and Border Protection - Port of Entry - Wilmington	Law Enforcement	X	X	X	X	X	X					X		X	X	X		X
US Drug Enforcement Administration - Wilmington	Law Enforcement	X	X	X	X	X	X		X			X			X	X		X
US Internal Revenue Service Criminal Investigation Division - Wilmington	Law Enforcement	X	X	X	X	X	X									X	X	X
US Marshals Service - Wilmington	Law Enforcement	X	X	X	X	X	X		X			X			X	X		X
University Of NC-Wilmington	Law Enforcement	X	X	X	X	X	X					X				X		
Wilmington International Airport - Airport Public Safety	Law Enforcement	X	X	X	X	X	X									X		X
Wilmington Police Department	Law Enforcement	X	X	X	X	X	X								X	X	X	X
Wrightsville Beach Police Department	Law Enforcement	X	X	X	X	X	X	X	X						X	X		
Alandale	Medical Facility	X	X	X	X	X	X					X			X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Alpha-Omega Health, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		
Alterra Clare Bridge of Wilmington	Medical Facility	X	X	X	X	X	X					X			X	X		
American Homepatient	Medical Facility	X	X	X	X	X	X									X	X	X
Americare	Medical Facility	X	X	X	X	X	X								X	X	X	X
Apria Healthcare, Inc.	Medical Facility	X	X	X	X	X	X									X	X	X
Arcadia Health Care	Medical Facility	X	X	X	X	X	X					X			X	X		X
Assistedcare, Inc.	Medical Facility	X	X	X	X	X	X		X							X	X	X
Autumn Care of Myrtle Grove	Medical Facility	X	X	X	X	X	X					X			X	X		
Banks Therapeutic Home	Medical Facility	X	X	X	X	X	X								X	X	X	X
Barker Residence	Medical Facility	X	X	X	X	X	X	X	X						X	X		
Bethel	Medical Facility	X	X	X	X	X	X									X		
Bonds Home	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Brighton Road Facility	Medical Facility	X	X	X	X	X	X					X				X		
Britthaven Of North Chase	Medical Facility	X	X	X	X	X	X								X	X		
Britthaven Of Wrightsville	Medical Facility	X	X	X	X	X	X								X	X		
Bryant Home	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Cape Fear Group Homes Day Program	Medical Facility	X	X	X	X	X	X								X	X	X	X
Cape Fear Home Care of Wilmington, Inc.	Medical Facility	X	X	X	X	X	X								X	X		X
Cape Fear Hospital	Medical Facility	X	X	X	X	X	X					X			X	X		
Cape Fear Respicare, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
Cape Fear Respite Home	Medical Facility	X	X	X	X	X	X	X	X			X			X	X		
Cardiac Rehab Program of The Coastal Heart Center	Medical Facility	X	X	X	X	X	X									X		
Carolina Hospice and Palliative Care	Medical Facility	X	X	X	X	X	X					X			X	X		X
Carolyn's Home	Medical Facility	X	X	X	X	X	X								X	X	X	X

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Champions at Porters Neck	Medical Facility	X	X	X	X	X	X					X						
Chester Street Home	Medical Facility	X	X	X	X	X	X					X			X	X		
Coastal Horizons Center, Inc.	Medical Facility	X	X	X	X	X	X							X	X	X		X
Continuum Home Care of Northchase	Medical Facility	X	X	X	X	X	X								X	X		
Copymatic Of Wilmington	Medical Facility	X	X	X	X	X	X								X	X	X	X
Cornelia Nixon Davis Health Care Center	Medical Facility	X	X	X	X	X	X					X						
Cypress Pointe Rehabilitation and Health Care Center	Medical Facility	X	X	X	X	X	X									X		X
Dixon Home	Medical Facility	X	X	X	X	X	X					X				X		
MS Services, Inc	Medical Facility	X	X	X	X	X	X									X	X	X
Drug and Alcohol Assessment Services	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
East Coast Solutions	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
El Ogden	Medical Facility	X	X	X	X	X	X					X			X	X		
Eldo Family Care Home #3	Medical Facility	X	X	X	X	X	X								X	X	X	X
Eltringham Facility	Medical Facility	X	X	X	X	X	X	X	X			X			X	X		
Evergreen Health Services	Medical Facility	X	X	X	X	X	X								X	X		
Fannie Norwood Memorial Home	Medical Facility	X	X	X	X	X	X								X	X		X
Farr Facility	Medical Facility	X	X	X	X	X	X					X				X		
Gingrich Home	Medical Facility	X	X	X	X	X	X		X			X	X	X	X	X		X
Greenville Loop Group Home	Medical Facility	X	X	X	X	X	X		X							X		
Harvest of Wilmington	Medical Facility	X	X	X	X	X	X					X			X	X		X
Healthmate Home Care	Medical Facility	X	X	X	X	X	X									X	X	X
Hermitage House Rest Home	Medical Facility	X	X	X	X	X	X					X			X	X		X
Herring Associates Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		X

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Holland Facility	Medical Facility	X	X	X	X	X	X								X	X		
Hospice Care Center	Medical Facility	X	X	X	X	X	X					X		X		X		
House of Love	Medical Facility	X	X	X	X	X	X					X			X	X		
Howell Support Services, LLC	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Human Interactive Services Inc,	Medical Facility	X	X	X	X	X	X					X				X		X
Hunters Trail RTP	Medical Facility	X	X	X	X	X	X					X	X	X	X	X		
Interim Healthcare	Medical Facility	X	X	X	X	X	X								X	X	X	X
Jordan's Family Care Home	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Judge Family Care Home #1	Medical Facility	X	X	X	X	X	X							X	X	X		
Judge Family Care Home #4	Medical Facility	X	X	X	X	X	X							X	X	X		
Kelly House	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Kerr House	Medical Facility	X	X	X	X	X	X		X							X		
Keys Community Rehabilitation Program	Medical Facility	X	X	X	X	X	X								X	X	X	X
Kight's Medical Corp.	Medical Facility	X	X	X	X	X	X								X	X		
Lancaster Home	Medical Facility	X	X	X	X	X	X							X	X	X		
Liberty Commons Nursing and Rehabilitation Center	Medical Facility	X	X	X	X	X	X							X	X	X		
Liberty Home Care	Medical Facility	X	X	X	X	X	X					X			X	X		X
Liberty Medical Specialties, Inc.	Medical Facility	X	X	X	X	X	X									X	X	X
Liberty Nursing Services, LLC	Medical Facility	X	X	X	X	X	X					X			X	X		X
Life, Inc./Cherokee Trail Group Home	Medical Facility	X	X	X	X	X	X					X				X		
Life, Inc./Masonboro Sound	Medical Facility	X	X	X	X	X	X					X						
Lifetime Resources, Inc. Echo Farms Group Home	Medical Facility	X	X	X	X	X	X		X			X			X	X		
Lincare, Inc.	Medical Facility	X	X	X	X	X	X							X	X	X	X	X

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Longleaf Hills Drive	Medical Facility	X	X	X	X	X	X								X	X		
Lowe Family Care Home #2	Medical Facility	X	X	X	X	X	X					X			X	X		
Lowe Family Care Home #3	Medical Facility	X	X	X	X	X	X					X			X	X		
Lower Cape Fear Hospice, Inc.	Medical Facility	X	X	X	X	X	X					X		X	X	X		X
Lower's Family Care	Medical Facility	X	X	X	X	X	X								X	X	X	X
Lowe's Family Care Home #1	Medical Facility	X	X	X	X	X	X					X			X	X		
Mariner Health of Wilmington	Medical Facility	X	X	X	X	X	X					X		X	X	X		X
Maxim Healthcare Services	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Maxim Healthcare Services, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Medox Healthcare, Inc.	Medical Facility	X	X	X	X	X	X								X	X		X
Mega Force Staffing	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Mill Creek Court	Medical Facility	X	X	X	X	X	X					X				X		X
Myrtle Grove Group Home	Medical Facility	X	X	X	X	X	X					X			X	X		
New Directions Counseling Center	Medical Facility	X	X	X	X	X	X								X	X		
New Hanover Regional Medical Center	Medical Facility	X	X	X	X	X	X									X		
New Hanover Treatment Center	Medical Facility	X	X	X	X	X	X								X	X		X
New Visions	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Nielsen's Rest Home	Medical Facility	X	X	X	X	X	X								X	X		
Ocean House	Medical Facility	X	X	X	X	X	X								X	X	X	X
Option Care of Wilmington	Medical Facility	X	X	X	X	X	X								X	X		
Oxy-Care Equipment Company	Medical Facility	X	X	X	X	X	X					X			X	X		X
Palliative Care Center of Lower Cape Fear Hospice	Medical Facility	X	X	X	X	X	X					X		X	X	X		X
Partners in Healing Counseling Center	Medical Facility	X	X	X	X	X	X								X	X		
Patrick Home	Medical Facility	X	X	X	X	X	X	X	X			X			X	X	X	X

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Plantation Village	Medical Facility	X	X	X	X	X	X											
Plum Nearly 1	Medical Facility	X	X	X	X	X	X	X	X						X	X		X
Plum Nearly 2	Medical Facility	X	X	X	X	X	X	X	X						X	X		X
Port City Plantation	Medical Facility	X	X	X	X	X	X					X			X	X		
Port South Village/Carmen D. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Port South Village/Catherine S. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Port South Village/Crystal L. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Port South Village/Lorraine B. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Port South Village/Tara L. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Port South Village/Teresa C. Villa	Medical Facility	X	X	X	X	X	X								X	X	X	X
Portofino Home	Medical Facility	X	X	X	X	X	X					X		X	X	X		X
Professional Healthcare Consultants	Medical Facility	X	X	X	X	X	X					X			X	X		X
PSA Healthcare	Medical Facility	X	X	X	X	X	X								X	X		
Robert E. Lee Group Home	Medical Facility	X	X	X	X	X	X									X		
Robin Hood Group Home	Medical Facility	X	X	X	X	X	X									X		X
Rubinstein Facility	Medical Facility	X	X	X	X	X	X									X		
Sci Day Program	Medical Facility	X	X	X	X	X	X							X	X	X		X
Sci-Coastal House I and II	Medical Facility	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X
Searise	Medical Facility	X	X	X	X	X	X								X	X	X	X
Setter Lane RTP	Medical Facility	X	X	X	X	X	X					X				X		
Shelley	Medical Facility	X	X	X	X	X	X					X		X	X	X		
Sherwood Manor Rest Home	Medical Facility	X	X	X	X	X	X									X		X
Southeastern Center For MH/DD/SAS	Medical Facility	X	X	X	X	X	X									X		X
Southeastern Center-DWI/ Criminal Justice	Medical Facility	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Spring Arbor of Wilmington	Medical Facility	X	X	X	X	X	X								X	X		
Stepping Stone Manor	Medical Facility	X	X	X	X	X	X								X	X	X	X
Tab Ballis LCSW, CCAS	Medical Facility	X	X	X	X	X	X								X	X		X
The Commons at Brightmore	Medical Facility	X	X	X	X	X	X								X	X		
The Kempton At Brightmore	Medical Facility	X	X	X	X	X	X								X	X		
The Meadows of Wilmington, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
The Russell Home	Medical Facility	X	X	X	X	X	X								X	X		
The W.A.V.E. (Wilmington Adult Vocational Enhancement)	Medical Facility	X	X	X	X	X	X		X						X	X	X	X
The Wilmington Treatment Center, Inc.	Medical Facility	X	X	X	X	X	X							X	X	X		
UCP-Lakewood	Medical Facility	X	X	X	X	X	X									X		
Watshare Today and Beyond	Medical Facility	X	X	X	X	X	X								X	X	X	X
Well Care Health Services, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
Well Care Home Health	Medical Facility	X	X	X	X	X	X								X	X		
Wilmington Day Program	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Wilmington Health Associates	Medical Facility	X	X	X	X	X	X							X		X		
Wilmington Surgcare	Medical Facility	X	X	X	X	X	X									X		X
Wilmington Treatment Center Outpatient Services	Medical Facility	X	X	X	X	X	X					X			X	X		
A H Snipes Academy of Arts/Des	Public School	X	X	X	X	X	X								X	X	X	X
Bradley Creek Elementary	Public School	X	X	X	X	X	X					X				X		
Cape Fear Center for Inquiry	Public School	X	X	X	X	X	X								X	X		
Carolina Beach Elementary	Public School	X	X	X	X	X	X	X	X						X	X		
Castle Hayne Elementary	Public School	X	X	X	X	X	X					X			X	X	X	X
Charles P Murray Middle	Public School	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
College Park Elementary	Public School	X	X	X	X	X	X					X			X	X		
D.C. Virgo Preparatory Academy	Public School	X	X	X	X	X	X								X	X	X	X
Dr Hubert Eaton Sr Elem	Public School	X	X	X	X	X	X					X			X	X		
Dr John Codington Elem	Public School	X	X	X	X	X	X					X			X	X		
Edwin A Alderman Elementary	Public School	X	X	X	X	X	X					X				X		
Edwin A Anderson Elementary	Public School	X	X	X	X	X	X									X		
Emma B Trask Middle	Public School	X	X	X	X	X	X					X			X	X		
Emsley A Laney High	Public School	X	X	X	X	X	X		X						X	X		
Eugene Ashley High	Public School	X	X	X	X	X	X								X	X		
Forest Hills Elementary	Public School	X	X	X	X	X	X					X				X	X	X
Gregory Elementary	Public School	X	X	X	X	X	X								X	X		X
Heyward C Bellamy Elem	Public School	X	X	X	X	X	X					X				X		
Holly Shelter Middle	Public School	X	X	X	X	X	X								X	X	X	X
Holly Tree Elementary	Public School	X	X	X	X	X	X					X			X	X		
Isaac M Bear High	Public School	X	X	X	X	X	X								X	X		
John J Blair Elementary	Public School	X	X	X	X	X	X								X	X		
John T Hoggard High	Public School	X	X	X	X	X	X								X	X		
Lake Forest Academy	Public School	X	X	X	X	X	X									X	X	X
Lakeside	Public School	X	X	X	X	X	X	X	X			X		X		X	X	X
M C S Noble Middle	Public School	X	X	X	X	X	X								X	X		
Mary C Williams Elementary	Public School	X	X	X	X	X	X									X		
Mary Sidberry Mosley Plc	Public School	X	X	X	X	X	X	X	X			X		X		X	X	X
Murrayville Elementary	Public School	X	X	X	X	X	X									X		
Myrtle Grove Middle	Public School	X	X	X	X	X	X					X				X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
New Hanover High	Public School	X	X	X	X	X	X								X	X		X
New Hanover Reg Detention Ctr	Public School	X	X	X	X	X	X					X				X	X	X
Ogden Elementary	Public School	X	X	X	X	X	X					X				X		
Pine Valley Elementary	Public School	X	X	X	X	X	X									X		
R Freeman Sch Of Engineering	Public School	X	X	X	X	X	X	X	X						X	X		X
Rolandgrise Middle	Public School	X	X	X	X	X	X					X			X	X		
Sunset Park Elementary	Public School	X	X	X	X	X	X						X	X	X	X	X	X
Walter L Parsley Elementary	Public School	X	X	X	X	X	X											
Williston Middle	Public School	X	X	X	X	X	X								X	X		X
Wilmington Early College High	Public School	X	X	X	X	X	X						X	X	X	X		
Wilmington Preparatory Academy	Public School	X	X	X	X	X	X					X			X	X		
Winter Park Model Elementary	Public School	X	X	X	X	X	X								X	X		
Wrightsboro Elementary	Public School	X	X	X	X	X	X								X	X		X
Wrightsville Beach Elem	Public School	X	X	X	X	X	X	X	X						X	X		
Onslow County																		
Onslow County Emergency Management	Other	X	X	X	X	X	X								X	X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X				X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X				X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X											
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X									X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X											
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X			X	X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X						
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X		X	X	X		X

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X								X	X		
Camp Lejeune Fire Department-DOD	EMS	X	X	X	X	X	X					X						
Camp Lejuene Fire Department-DOD	EMS	X	X	X	X	X	X									X		
Jacksonville Fire Department Station 1 - HQ	EMS	X	X	X	X	X	X					X			X	X		
Jacksonville Fire Department Station 2	EMS	X	X	X	X	X	X		X									
Jacksonville Fire Department Station 3	EMS	X	X	X	X	X	X							X	X	X		
Jacksonville Fire Department Station 4	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 1 & 11	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 2	EMS	X	X	X	X	X	X					X				X		
Onslow County EMS Station 3	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 4	EMS	X	X	X	X	X	X					X				X		
Onslow County EMS Station 5	EMS	X	X	X	X	X	X					X			X	X		
Onslow County EMS Station 6	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 7	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 8	EMS	X	X	X	X	X	X					X			X	X	X	X
Onslow County EMS Station 9	EMS	X	X	X	X	X	X								X	X		
Onslow County EMS Station 10	EMS	X	X	X	X	X	X								X	X		
Albert J Ellis Airport Crash Fire and Rescue	Fire Stations	X	X	X	X	X	X					X				X		
Back Swamp Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X				X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X				X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X											
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X									X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X											

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X			X	X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X						
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X		X	X	X		X
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X								X	X		
Camp Lejeune Fire Department-DOD	Fire Stations	X	X	X	X	X	X					X						
Camp Lejuene Fire Department-DOD	Fire Stations	X	X	X	X	X	X									X		
Half Moon Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X						
Haws Run Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X						
Holly Ridge Volunteer Fire and Rescue Dept.	Fire Stations	X	X	X	X	X	X						X	X	X	X		
Hubert Volunteer Fire Department – Main Station	Fire Stations	X	X	X	X	X	X					X			X	X		
Hubert Volunteer Fire Department – White Oak Station	Fire Station	X	X	X	X	X	X											
Jacksonville Fire Department Station 1 - HQ	Fire Stations	X	X	X	X	X	X					X			X	X		
Jacksonville Fire Department Station 2	Fire Stations	X	X	X	X	X	X		X									
Jacksonville Fire Department Station 3	Fire Stations	X	X	X	X	X	X							X	X	X		
Jacksonville Fire Department Station 4	Fire Stations	X	X	X	X	X	X								X	X		
Maysville Fire Department - Belgrade Station	Fire Stations	X	X	X	X	X	X					X						
Maysville Fire Department - Loco Station	Fire Stations	X	X	X	X	X	X								X	X		
Nine Mile Voluntary Fire Department	Fire Stations	X	X	X	X	X	X	X	X			X						
North Topsail Beach Fire Department – Station 1	Fire Stations	X	X	X	X	X	X	X	X			X						
North Topsail Beach Fire Department – Station 2	Fire Stations	X	X	X	X	X	X	X	X						X	X		
Onslow County Fire & Rescue – Bear Creek Station	Fire Station	X	X	X	X	X	X											
Onslow County Fire & Rescue – Freedom Way Station	Fire Station	X	X	X	X	X	X								X	X		
Piney Green Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X	X	X

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Pumpkin Center Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Rhodestown Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Richlands Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Southwest Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X				X		
Swansboro Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Turkey Creek Volunteer Fire Department – Main Station	Fire Stations	X	X	X	X	X	X					X						
Turkey Creek Volunteer Fire Department - Sneads Ferry Station	Fire Stations	X	X	X	X	X	X					X				X		
Verona Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Albert J Ellis Airport Police	Law Enforcement	X	X	X	X	X	X					X				X		
City of Jacksonville Police Department	Law Enforcement	X	X	X	X	X	X					X			X	X		
Holly Ridge Police Department	Law Enforcement	X	X	X	X	X	X						X	X	X	X		
NC Division of Parks - Hammocks Beach State Park	Law Enforcement	X	X	X	X	X	X		X									
NC State Highway Patrol Troop B District III	Law Enforcement	X	X	X	X	X	X								X	X		
North Topsail Beach Police Department	Law Enforcement	X	X	X	X	X	X	X	X						X	X		
Onslow County Sheriff's Office / Onslow County Jail	Law Enforcement	X	X	X	X	X	X		X						X	X		
Richlands Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
Swansboro Police Department	Law Enforcement	X	X	X	X	X	X								X	X		
A Caring Heart Case Management	Medical Facility	X	X	X	X	X	X									X		
Agape Health Services	Medical Facility	X	X	X	X	X	X								X	X		
Anna's Care, Inc.	Medical Facility	X	X	X	X	X	X					X						
Bridge of Hope	Medical Facility	X	X	X	X	X	X								X	X		
Brynn Marr Hospital	Medical Facility	X	X	X	X	X	X								X	X		
Cameron House	Medical Facility	X	X	X	X	X	X											

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		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Cape Cod	Medical Facility	X	X	X	X	X	X											
Carobell Day Program/Day Activity Program	Medical Facility	X	X	X	X	X	X					X						
Carobell Group Home	Medical Facility	X	X	X	X	X	X							X	X	X		
Carolina Home Medical, Inc	Medical Facility	X	X	X	X	X	X									X		
Carolina Rivers Nursing & Rehabilitation	Medical Facility	X	X	X	X	X	X									X		
Changing Lives	Medical Facility	X	X	X	X	X	X											
CDTEG, Inc.	Medical Facility	X	X	X	X	X	X											
Coastal Transitional Services, Inc.	Medical Facility	X	X	X	X	X	X							X	X	X		
Continuum Home Care and Hospice	Medical Facility	X	X	X	X	X	X									X		
Cottages of Swansboro I-VI	Medical Facility	X	X	X	X	X	X									X		
Countryview Day Program	Medical Facility	X	X	X	X	X	X		X			X		X		X		
Countryview Residential	Medical Facility	X	X	X	X	X	X					X				X		
Eagles Nest Retreat	Medical Facility	X	X	X	X	X	X								X	X		
East Carolina Gastroenterology	Medical Facility	X	X	X	X	X	X											
F.A.C.T. Day Treatment Program	Medical Facility	X	X	X	X	X	X								X	X		
Faith Therapeutic Services	Medical Facility	X	X	X	X	X	X					X						
Guardian Care Adult Day Program	Medical Facility	X	X	X	X	X	X								X	X		
Greenbriar-J	Medical Facility	X	X	X	X	X	X							X	X	X		
Hampton Home	Medical Facility	X	X	X	X	X	X									X		
Harris Home	Medical Facility	X	X	X	X	X	X					X				X		
Healthy Living Cardiac Rehabilitation	Medical Facility	X	X	X	X	X	X					X		X	X	X		
Heritage of Richlands	Medical Facility	X	X	X	X	X	X					X						
Hillside Court	Medical Facility	X	X	X	X	X	X								X	X		
IQUOLIOC, Inc.	Medical Facility	X	X	X	X	X	X											

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Idlebrook House	Medical Facility	X	X	X	X	X	X									X		
Interim Healthcare	Medical Facility	X	X	X	X	X	X					X		X	X	X		
Jacksonville Treatment Center, LLC	Medical Facility	X	X	X	X	X	X									X		
Kenwood House	Medical Facility	X	X	X	X	X	X											
Lennox House	Medical Facility	X	X	X	X	X	X											
Liberty Commons Assisted Living	Medical Facility	X	X	X	X	X	X									X		
Liberty Home Care & Hospice	Medical Facility	X	X	X	X	X	X									X		
Lighthouse Village	Medical Facility	X	X	X	X	X	X								X	X		
Linda Shorts Home	Medical Facility	X	X	X	X	X	X								X	X		
Lower Cape Fear Home Health & Hospice	Medical Facility	X	X	X	X	X	X								X	X		
McCullen Home	Medical Facility	X	X	X	X	X	X											
Naval Hospital Camp Lejeune	Medical Facility	X	X	X	X	X	X											
Nantucket	Medical Facility	X	X	X	X	X	X					X				X		
Onslow House	Medical Facility	X	X	X	X	X	X								X	X		
Onslow Memorial Hospital	Medical Facility	X	X	X	X	X	X					X		X	X	X		
Onslow Senior Services	Medical Facility	X	X	X	X	X	X								X	X		
Pearl's Family Care Home #1	Medical Facility	X	X	X	X	X	X											
Pearl's Family Care Home #2	Medical Facility	X	X	X	X	X	X											
Pearl's Family Care Home #3	Medical Facility	X	X	X	X	X	X											
People of Potential, Inc	Medical Facility	X	X	X	X	X	X											
Premier Nursing & Rehabilitation Center	Medical Facility	X	X	X	X	X	X											
Positive Influences, Inc	Medical Facility	X	X	X	X	X	X					X		X		X		
Port Health Services	Medical Facility	X	X	X	X	X	X											
Pine Valley House	Medical Facility	X	X	X	X	X	X											

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		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Project Vision	Medical Facility	X	X	X	X	X	X											
Project Voice	Medical Facility	X	X	X	X	X	X					X			X	X		
Quality Home Staffing, Inc	Medical Facility	X	X	X	X	X	X											
Queen's Pond	Medical Facility	X	X	X	X	X	X											
Sandridge	Medical Facility	X	X	X	X	X	X					X						
Shadowridge Retreat	Medical Facility	X	X	X	X	X	X									X		
Shining Hearts Home Care of North Carolina, LLC	Medical Facility	X	X	X	X	X	X											
Silverleaf Lodge	Medical Facility	X	X	X	X	X	X							X	X	X		
South Shore House	Medical Facility	X	X	X	X	X	X											
Suffolk Home	Medical Facility	X	X	X	X	X	X									X		
Surgicare Of Jacksonville	Medical Facility	X	X	X	X	X	X							X	X	X		
Sweet Waters Homecare, LLC	Medical Facility	X	X	X	X	X	X											
The Arc Community	Medical Facility	X	X	X	X	X	X					X			X	X		
Thrive Skilled Pediatric Care	Medical Facility	X	X	X	X	X	X											
Victress Healthcare Staffing Solutions	Medical Facility	X	X	X	X	X	X								X	X		
Well Care Home Care, Inc	Medical Facility	X	X	X	X	X	X								X	X		
Bell Fork Elementary	Public School	X	X	X	X	X	X						X	X	X	X		
Bitz Intermediate School	Public School	X	X	X	X	X	X											
Blue Creek Elementary	Public School	X	X	X	X	X	X								X	X		
Brewster Middle	Public School	X	X	X	X	X	X					X		X				
Carla Johnson Primary School	Public School	X	X	X	X	X	X					X						
Carolina Forest Elementary	Public School	X	X	X	X	X	X					X				X		
Clyde Erwin Elementary	Public School	X	X	X	X	X	X							X	X	X		
Delalio Elementary	Public School	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Dixon Elementary	Public School	X	X	X	X	X	X								X	X		
Dixon High	Public School	X	X	X	X	X	X								X	X		
Dixon Middle	Public School	X	X	X	X	X	X								X	X		
Heroes Elementary	Public School	X	X	X	X	X	X		X									
Hunters Creek Elementary	Public School	X	X	X	X	X	X					X						
Hunters Creek Middle	Public School	X	X	X	X	X	X									X		
Jacksonville Commons Elem	Public School	X	X	X	X	X	X								X	X		
Jacksonville Commons Middle	Public School	X	X	X	X	X	X								X	X		
Jacksonville High	Public School	X	X	X	X	X	X											
Lejeune High	Public School	X	X	X	X	X	X					X		X				
Meadow View Elementary	Public School	X	X	X	X	X	X					X						
Morton Elementary	Public School	X	X	X	X	X	X											
New Bridge Middle	Public School	X	X	X	X	X	X								X	X		
Northside High	Public School	X	X	X	X	X	X									X		
Northwoods Elementary	Public School	X	X	X	X	X	X											
Northwoods Park Middle	Public School	X	X	X	X	X	X	X	X									
Parkwood Elementary	Public School	X	X	X	X	X	X											
Queens Creek Elementary	Public School	X	X	X	X	X	X								X	X		
Richlands Elementary	Public School	X	X	X	X	X	X								X	X		
Richlands High	Public School	X	X	X	X	X	X								X	X		
Richlands Primary	Public School	X	X	X	X	X	X								X	X		
Sand Ridge Elementary	Public School	X	X	X	X	X	X											
Silverdale Elementary	Public School	X	X	X	X	X	X											
Southwest Elementary	Public School	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Southwest High	Public School	X	X	X	X	X	X					X			X	X		
Southwest Middle	Public School	X	X	X	X	X	X								X	X		
Stateside Elementary	Public School	X	X	X	X	X	X											
Summersill Elementary	Public School	X	X	X	X	X	X											
Swansboro Elementary	Public School	X	X	X	X	X	X								X	X		
Swansboro High	Public School	X	X	X	X	X	X								X	X		
Swansboro Middle	Public School	X	X	X	X	X	X					X			X	X		
Tarawa Terrace I Elementary	Public School	X	X	X	X	X	X								X	X		
Tarawa Terrace II Elementary	Public School	X	X	X	X	X	X					X			X	X		
Trexler Middle	Public School	X	X	X	X	X	X								X	X		
White Oak High	Public School	X	X	X	X	X	X											
Pender County																		
Pender County Emergency Operations Center	Other	X	X	X	X	X	X					X			X	X		X
Pender County Emergency Operations Center-Alternate	Other	X	X	X	X	X	X								X	X	X	X
Hampstead Volunteer Fire Department	EMS	X	X	X	X	X	X					X			X	X		
NC Division of Forest Resources District 8 - Pender County	EMS	X	X	X	X	X	X					X			X	X		
Pender EMS	EMS	X	X	X	X	X	X								X	X		
Pender Volunteer EMS and Rescue Station 1	EMS	X	X	X	X	X	X								X	X	X	X
Pender Volunteer EMS and Rescue Station 2	EMS	X	X	X	X	X	X					X			X	X		
Pender Volunteer EMS and Rescue Station 4	EMS	X	X	X	X	X	X	X	X						X	X		
Pender Volunteer EMS and Rescue Station 5 - Union Rescue Squad	EMS	X	X	X	X	X	X								X	X	X	X
Pender Volunteer EMS and Rescue Station 6	EMS	X	X	X	X	X	X					X			X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Pender Volunteer EMS and Rescue Station 7 - Headquarters	EMS	X	X	X	X	X	X								X	X	X	X
Pender Volunteer EMS and Rescue Station 8	EMS	X	X	X	X	X	X								X	X		
Rocky Point Volunteer Fire Department Station 22	EMS	X	X	X	X	X	X					X			X	X	X	X
Shiloh-Columbia Volunteer Fire Department Station 1900	EMS	X	X	X	X	X	X								X	X		
Topsail Beach Fire Department	EMS	X	X	X	X	X	X	X	X						X	X		
Union Rescue Squad	EMS	X	X	X	X	X	X								X	X	X	X
Atkinson Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Burgaw Fire Department	Fire Stations	X	X	X	X	X	X								X	X	X	X
Hampstead Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Long Creek Grady Volunteer Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Maple Hill Volunteer Fire Department	Fire Stations	X	X	X	X	X	X		X			X			X	X		
NC Division of Forest Resources District 8 - Pender County	Fire Stations	X	X	X	X	X	X					X			X	X		
Penderlea Volunteer Fire Department	Fire Stations	X	X	X	X	X	X		X			X			X	X		
Rocky Point Volunteer Fire Department Station 22	Fire Stations	X	X	X	X	X	X					X			X	X	X	X
Shiloh-Columbia Volunteer Fire Department Station 1900	Fire Stations	X	X	X	X	X	X								X	X		
Sloop Point Fire Department	Fire Stations	X	X	X	X	X	X					X			X	X		
Surf City Fire Department	Fire Stations	X	X	X	X	X	X	X	X			X			X	X		
Surf City Volunteer Fire Department	Fire Stations	X	X	X	X	X	X								X	X		
Topsail Beach Fire Department	Fire Stations	X	X	X	X	X	X	X	X						X	X		
Burgaw Police Department	Law Enforcement	X	X	X	X	X	X								X	X	X	X

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
NC State Highway Patrol Troop B District IV - Substation	Law Enforcement	X	X	X	X	X	X								X	X	X	X
Pender County Sheriff's Office	Law Enforcement	X	X	X	X	X	X					X			X	X		X
Surf City Police Department	Law Enforcement	X	X	X	X	X	X	X	X			X			X	X		
Topsail Beach Police Department	Law Enforcement	X	X	X	X	X	X	X	X						X	X		
Carr Facility	Medical Facility	X	X	X	X	X	X		X									
CDTEG, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		X
Forest Lane Family Care Home #1	Medical Facility	X	X	X	X	X	X					X			X	X		
Forest Lane Family Care Home #2	Medical Facility	X	X	X	X	X	X					X			X	X		
Huntington Health Care	Medical Facility	X	X	X	X	X	X								X	X	X	X
Huntington Health Care	Medical Facility	X	X	X	X	X	X								X	X	X	X
Janice Nichols Home	Medical Facility	X	X	X	X	X	X								X	X	X	X
Karon's Family Care Home	Medical Facility	X	X	X	X	X	X								X	X		
Karon's Family Care Home	Medical Facility	X	X	X	X	X	X								X	X		
Liberty Home Care	Medical Facility	X	X	X	X	X	X	X	X			X			X	X	X	X
Liberty Home Care	Medical Facility	X	X	X	X	X	X	X	X			X			X	X	X	X
Major Home Care	Medical Facility	X	X	X	X	X	X								X	X		
Major Home Care	Medical Facility	X	X	X	X	X	X								X	X		
Pender Adult Services, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		X
Pender Adult Services, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X		X
Pender County Center	Medical Facility	X	X	X	X	X	X								X	X		X
Pender County Center	Medical Facility	X	X	X	X	X	X								X	X		X
Pender County DSS	Medical Facility	X	X	X	X	X	X								X	X		X
Pender County DSS	Medical Facility	X	X	X	X	X	X								X	X		X

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Pender Home Health	Medical Facility	X	X	X	X	X	X								X	X	X	X
Pender Memorial Hospital, Inc.	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Piney Wood Family Care Home	Medical Facility	X	X	X	X	X	X					X			X	X		
Robert Ayers Home	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
Robert Ayers Home	Medical Facility	X	X	X	X	X	X					X			X	X	X	X
The Meadows of Burgaw	Medical Facility	X	X	X	X	X	X		X						X	X	X	X
The Meadows of Burgaw	Medical Facility	X	X	X	X	X	X		X						X	X	X	X
Well Care Health Services, Inc.	Medical Facility	X	X	X	X	X	X								X	X	X	X
Woodbury Wellness Center, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
Woodbury Wellness Center, Inc.	Medical Facility	X	X	X	X	X	X								X	X		
Burgaw Elementary	Public School	X	X	X	X	X	X								X	X	X	X
Burgaw Middle	Public School	X	X	X	X	X	X		X			X			X	X	X	X
Cape Fear Elementary	Public School	X	X	X	X	X	X					X			X	X		
Cape Fear Middle	Public School	X	X	X	X	X	X					X			X	X		
Heide Trask High	Public School	X	X	X	X	X	X					X			X	X	X	X
Malpass Corner Elementary	Public School	X	X	X	X	X	X								X	X		
North Topsail Elementary	Public School	X	X	X	X	X	X					X						
Pender Early College High	Public School	X	X	X	X	X	X					X			X	X	X	X
Pender High	Public School	X	X	X	X	X	X								X	X		
Penderlea Elementary	Public School	X	X	X	X	X	X		X						X	X		
Rocky Point Primary	Public School	X	X	X	X	X	X								X	X		X
South Topsail Elementary	Public School	X	X	X	X	X	X					X				X		
Topsail Elementary	Public School	X	X	X	X	X	X					X			X	X		
Topsail High	Public School	X	X	X	X	X	X								X	X		

FACILITY NAME	FACILITY TYPE	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Topsail Middle	Public School	X	X	X	X	X	X								X	X		
West Pender Middle	Public School	X	X	X	X	X	X					X			X	X		

SECTION 7
CAPABILITY ASSESSMENT

This section discusses the capability of the participating jurisdictions in the Southeastern NC region to implement hazard mitigation activities. It consists of the following four subsections:

- 7.1 Overview
- 7.2 Conducting the Capability Assessment
- 7.3 Capability Assessment Findings
- 7.4 Conclusions on Local Capability

7.1 OVERVIEW

The purpose of conducting a Capability Assessment is to determine the ability of a local jurisdiction to implement a comprehensive Mitigation Strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. As in any planning process, it is important to try to establish which goals, objectives, and actions are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A Capability Assessment helps to determine which mitigation actions are practical and likely to be implemented over time given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A Capability Assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, and programs already in place; and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. The Capability Assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The Capability Assessment completed for the SENC Region serves as a critical planning step and an integral part of the foundation for designing an effective Mitigation Strategy. Coupled with the Risk Assessment, the Capability Assessment helps identify and target meaningful mitigation actions for incorporation into the Mitigation Strategy portion of the Plan. It not only helps establish the goals and objectives for the Region to pursue under this Plan, but also ensures that those goals and objectives are realistically achievable under given local conditions.

7.2 CONDUCTING THE CAPABILITY ASSESSMENT

In order to facilitate the inventory and analysis of local government capabilities within the Southeast NC region, the Capability Assessment sections from the previous Southeastern NC Regional Hazard Mitigation Plan and the previous Onslow County Hazard Mitigation Plan were reviewed and relevant information on capabilities *were* documented in this update. The project consultant then reviewed County and municipal websites to determine additional capabilities for documentation. Finally, the

participating jurisdictions reviewed the draft version of this update and provided any supplemental or missing capability information before the final plan was completed and adopted.
Capabilities that were reviewed included documentation on existing local plans, policies, programs, or ordinances that contribute to and/or hinder the Region's ability to implement hazard mitigation actions. Other indicators included information related to the Region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, as well as any existing education and outreach programs that can be used to promote mitigation. The participating jurisdictions were also asked to comment on the current political climate with respect to hazard mitigation, an important consideration for any local planning or decision making process.

At a minimum, the capability assessment provides an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development, in addition to their overall effect on hazard loss reduction. In completing the assessment, local officials were also asked to conduct a self-assessment of their jurisdiction's specific capabilities. The capability assessment thereby not only helps accurately assess the degree of local capability, but it also serves as a good source of introspection for counties and local jurisdictions that want to improve their capabilities as identified gaps, weaknesses, or conflicts can be recast as opportunities for specific actions to be proposed as part of the Mitigation Action Plan.

7.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the *Capability Assessment* are summarized in this Plan to provide insight into the relevant capacity of the jurisdictions in the SENC Region to implement hazard mitigation activities. All information is based upon the input provided by local government officials.

7.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning, in addition to the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built, as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools or programs in place or under development for the jurisdictions in the SENC Region, along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

Table 7.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the jurisdictions in the SENC Region. A checkmark indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Hazard Mitigation Plan.

TABLE 7.1: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Brunswick County	√	√	√	√	√	√			√	√	√	√	√		√	√	√	√	√	√		√	√		√	√
Village of Bald Head Island	√	√	√	√	√					*	*	√			√	√	√	√	√			√	√		√	
Town of Belville	√	√	√	√						√	*	√			√	√	√	√	√			√	√		√	
City of Boiling Spring Lakes	√	√	√	√	√	√			√	√	*	√			√	√	√	√	√	√		√	√		√	
Town of Bolivia	√	√	√							*	*				√	√	√	√	√			√	√		√	
Town of Calabash	√	√	√	√					√	√	*	√	√	√	√	√	√	√	√	√	√	√	√		√	
Town of Carolina Shores	√	√	√		√					*	*				√	√	√	√	√			√	√		√	
Town of Caswell Beach	√	√	√							*	*				√	√	√	√	√			√	√		√	√

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Town of Holden Beach	√	√	√	√	√					*	*				√	√	√	√	√			√	√		√	√
Town of Leland	√	√	√	√	√					√	*	√			√	√	√	√	√			√	√		√	
Town of Navassa	√	√	√	√	√					*	*				√	√	√	√	√			√	√		√	
City of Northwest	√	√	√							*	*				√	√	√	√	√			√	√		√	
Town of Oak Island	√	√	√	√	√					*	*	√			√	√	√	√	√			√	√		√	√
Town of Ocean Isle Beach	√	√	√	√	√					*	*	√			√	√	√	√	√			√	√		√	√
Town of Saint James	√	√	√	√					√	√	*	√			√	√	√	√	√	√		√	√		√	
Town of Sandy Creek	√	√								*	*				√		√	√	√			√	√			
Town of Shallotte	√	√	√	√	√					*	*	√			√	√	√	√	√			√	√		√	
City of Southport	√	√	√	√	√				√	√	*	√			√	√	√	√	√	√		√	√		√	√

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Town of Sunset Beach	√	√	√	√	√					*	*	√			√	√	√	√	√			√	√		√	√
Town of Varnamtown	√	√	√							*	*				√	√	√	√	√			√	√		√	
New Hanover County	√	√	√	√	√	√	√	√	√	√	√	√			√	√	√	√	√		√	√	√		√	√
Town of Carolina Beach	√	√	√	√	√	√	√	√	√	√	*	√			√	√	√	√	√		√	√	√		√	√
Town of Kure Beach	√	√	√	√		√	√	√	√	√	*	√			√	√	√	√	√			√	√		√	√
City of Wilmington	√	√	√	√	√	√	√	√	√	√	*	√	√	√	√	√	√	√	√			√	√		√	
Town of Wrightsville Beach	√	√	√	√	√	√	√	√	√	√	*	√			√	√	√	√	√			√	√		√	√
Onslow County	√	√	√	*	√	√			√	√	*	√	*		√	√	√	√	√			√	√		√	√
City of Jacksonville	√	√		√	√	√			√	√	√	√		√	√	√	√	√	√	√		√	√		√	√

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Town of Holly Ridge	√	√	√			√					*				√	√	√	√	√			√	√		√	
Town of North Topsail Beach	√	√	√	√	√	√			√	√	*	*			√	√	√	√	√	√		√	√		√	√
Town of Richlands	√	√		√	√	√			*		*	√			√	√	√	√	√			√	√		√	
Town of Swansboro	√	√	√	√	√	√				√	*		√	√	√	√	√	√	√	√		√	√		√	
Pender County	√	√				√				√	√	√	√		√	√	√	√	√	√		√	√		√	*
Town of Atkinson	√	√	√								*				√	√	√	√	√			√	√		√	
Town of Burgaw	√	√	√	√							*	√			√	√	√	√	√			√	√		√	
Village of Saint Helena	√	√	√								*				√	√	√	√	√			√	√		√	
Town of Surf City	√	√	√	√	√	√			√	√	√	√	*		√	√	√	√	√	*	*	√	√		√	*

Jurisdiction	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Town of Topsail Beach	√	√	√	√	√						*	√			√	√	√	√	√			√	√		√	√
Town of Watha	√	√	√								*				√	√	√	√	√			√	√		√	

A more detailed discussion on the Region's planning and regulatory capability follows, along with the incorporation of additional information based on the narrative comments provided by local officials.

7.3.1.1 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases are preparedness, response, and recovery. In reality each phase is interconnected with hazard mitigation, as **Figure 7.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as elevation of flood-prone structures or through the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards because of its location, design, or other characteristics. Mitigation opportunities can also be identified during immediate preparedness or response activities (such as installing storm shutters in advance of a hurricane), and in many instances during the long-term recovery and redevelopment process following a disaster event.

FIGURE 7.1: THE FOUR PHASES OF EMERGENCY MANAGEMENT

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment documents community capabilities across a range of emergency management plans in order to assess each participating jurisdiction's willingness to plan and their level of technical planning proficiency. Some examples of emergency management capabilities include the following:

Hazard Mitigation Plan

A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural, and in some cases human-caused, hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

Disaster Recovery Plan

A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster event. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

Emergency Operations Plan

An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

Continuity of Operations Plan

A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

7.3.1.2 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. The Capability Assessment documents general planning capabilities and the degree to which hazard mitigation is integrated into other ongoing planning efforts in the region.

Some examples of general planning capabilities include the following:

Comprehensive/General Plan

A comprehensive land use plan, or general plan, establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

Capital Improvements Plan

A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

Historic Preservation Plan

A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards, and the identification of ways to reduce future damages.

This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards, or are within a historic district that cannot easily be relocated out of harm's way.

Zoning Ordinance

Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

Subdivision Ordinance

A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

Building Codes, Permitting, and Inspections

Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program, developed by the Insurance Services Office, Inc. (ISO). In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses, and as a result should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education, as well as number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10, with a BCEGS grade of 1 representing exemplary commitment to building code enforcement, and a grade of 10 indicating less than minimum recognized protection.

Other Relevant Plans and/or Planning Processes

Military Ocean Terminal Sunny Point (MOTSU) Joint Land Use Study

MOTSU is the largest military terminal in the world. It serves as the Army's primary East-coast deep water port for containerized ammunition and is a transfer point between rail, trucks, and ships for the import and export of weapons, ammunition, explosives and military equipment for United States Army. Recently, MOTSU partnered with the Cape Fear Council of Governments and the jurisdictions of Brunswick County, New Hanover County, Boiling Spring Lakes, Carolina Beach, Kure Beach, Leland, Southport to develop a joint land use study.

There is a Public Safety coordination element to the Joint Land Use Study that could be evaluated to see if there are elements that could compliment or be integrated with the regional hazard mitigation plan.

Resilient Redevelopment Plans

Following Hurricane Matthew, the State of North Carolina provided funding through the Disaster recovery Act of 2016 to assist impacted communities with the development of Resilient Redevelopment Plans. Plans were developed for all four counties in the SENC region. The primary goals were to: 1) develop strategic plans and actions; and, 2) define any unmet funding needs required to implement those actions after other funds are used. The resulting resilient redevelopment plans served as the foundation for any supplemental funding received through Congress, the North Carolina General Assembly and other funding sources. These plans also provided the basis for the state's Recovery Action Plan required by the U.S. Department of Housing and Urban Development heeded to spend funds allocated through the Community Development Block Grant – Disaster Relief program. The Resilient Redevelopment Plans should be evaluated to see what opportunities are present for integration with the hazard mitigation plan.

7.3.1.3 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. It is therefore used as part of this *Capability Assessment* as a key indicator for measuring local capability.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event, and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

NFIP information for each participating jurisdiction in the SENC Region can be found in **Table 7.2** below.

TABLE 7.2 NFIP INFORMATION FOR PARTICIPATING JURISDICTIONS

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force
Brunswick					
Brunswick County (Unincorporated Area)	12/09/77	12/6/19	3,891	$930,416,500	$1,842,138
City of Boiling Spring Lakes	03/02/89	8/28/08	171	$30,400,500	$55,418
City of Northwest	12/09/77	12/6/19	7	$1,218,000	$1,639
City of Southport	05/24/74	8/28/18	564	$114,773,300	$293,873
Town of Belville	12/09/77	8/28/18	66	$12,751,400	$20,201
Town of Bolivia	06/10/77	10/16/08	7	$408,000	$1,072
Town of Calabash	06/10/77	8/28/18	97	$18,897,800	$34,169
Town of Carolina Shores	06/10/77	8/28/18	779	$100,359,600	$122,791
Town of Caswell Beach	07/15/77	8/28/18	638	$139,596,300	$533,731
Town of Holden Beach	05/26/72	8/28/18	1,851	$507,197,300	$4,062,145
Town of Leland	12/09/77	8/28/18	1,031	$106,524,900	$137,558
Town of Navassa	12/09/77	12/6/19	17	$1,665,000	$2,288
Town of Oak Island	03/27/71	8/28/18	3,476	$829,941,000	$4,806,652
Town of Ocean Isle Beach	07/16/71	8/28/18	2,608	$622,976,800	$4,377,145
Town of Saint James	12/09/77	8/28/18	1,189	$289,948,100	$425,382
Town of Sandy Creek*			0	0	0
Town of Shallotte	05/24/74	8/28/18	202	$44,803,700	$93,891
Town of Sunset Beach	11/18/72	8/28/18	1,808	$447,423,600	$1,150,220
Town of Varnamtown	12/09/77	8/28/18	21	$4,417,900	$5,566

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force
Village of Bald Head Island	12/09/77	8/28/18	1,048	$328,874,300	$1,271,457
Subtotal Brunswick	-	-	19,471	$4,532,594,000	$19,237,336
Onslow					
City of Jacksonville	05/10/74	2/16/07	887	$166,135,500	$293,806
Onslow County (Unincorporated Area)	06/09/78	6/19/20	2,406	$461,968,400	$936,391
Town of Holly Ridge	11/03/05	6/19/20	42	$8,063,200	$17,474
Town of North Topsail Beach	06/09/78	6/19/20	1,217	$254,459,900	$1,827,357
Town of Richlands	07/11/75	6/19/20	41	$5,000,400	$9,052
Town of Swansboro	05/24/74	6/19/20	217	$40,013,100	$99,157
Subtotal Onslow	-	-	4,810	$935,640,500	$3,183,237
New Hanover					
City of Wilmington	03/01/74	8/28/18	3,817	$690,660,100	$1,683,886
New Hanover County (Unincorporated Area)	07/17/78	12/6/19	6,302	$1,373,247,400	$3,076,609
Town of Carolina Beach	05/26/72	8/28/18	3,510	$698,316,100	$3,041,350
Town of Kure Beach	02/15/74	2/16/07	971	$254,985,600	$704,720
Town of Wrightsville Beach	06/12/70	8/28/18	2,621	$672,664,700	$2,844,745
Subtotal New Hanover	-	-	17,221	$3,689,873,900	$11,351,310
Pender					
Pender County (Unincorporated Area)	10/29/76	2/16/07 and 12/6/19	2,284	$413,084,500	$973,514
Town of Atkinson	02/16/07	12/6/19	2	$385,000	$1,882
Town of Burgaw	01/19/00	02/16/07	89	$13,515,400	$68,479
Town of Surf City	05/24/74	02/16/07	1,775	$522,302,100	$3,154,736
Town of Topsail Beach	06/07/74	02/16/07	948	$292,230,400	$1,595,140
Town of Watha	10/29/76	02/16/07	2	$233,400	$1,865
Village of Saint Helena	10/29/76	02/16/07	4	$110,000	$1,873

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force
Subtotal Pender	-	-	5,104	$1,241,860,800	$5,797,489
TOTAL PLAN	-	-	46,606	$10,399,969,200	$39,569,372

Source: FEMA NFIP Policy Statistics; *Community not in NFIP

Most all of the jurisdictions in the Southeastern NC region participate in the National Flood Insurance Program and will continue to comply with all required provisions of the program and work to adequately comply in the future utilizing a number of strategies. Floodplain management is managed through zoning ordinances, building code restrictions, and the county building inspection program. The jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property. Each county and its municipalities while participating in the National Flood Insurance Program comply with regulations as demonstrated in regular Community Assessment Visits.

Community Rating System

An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP, adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 7.3** As class ratings improve (the lower the number, the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

TABLE 7.3: CRS PREMIUM DISCOUNTS, BY CLASS

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0%

Source: NFIP Community Rating System.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

CRS communities in the Southeastern NC Region include the following:

- Brunswick County
- Caswell Beach
- Holden Beach
- Oak Island
- Ocean Isle Beach
- Southport
- Sunset Beach
- New Hanover County
- Carolina Beach
- Kure Beach
- Wrightsville Beach
- Topsail Beach
- Onslow County
- Jacksonville
- North Topsail Beach

Floodplain Management Plan

A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

Open Space Management Plan

An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state, and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

Stormwater Management Plan

A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

7.3.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using geographic information systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment captured information on administrative and technical capability through the identification of available staff and personnel resources.

Table 7.4 provides summary results for the SENC Region with regard to relevant staff and personnel resources. A checkmark indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

TABLE 7.4: RELEVANT STAFF/PERSONNEL RESOURCES

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Brunswick County	√	√	√	√	√	√			√	√	√	√	√	√
City of Boiling Spring Lakes	√	√	√		√	√			√	√	√		√	√
City of Jacksonville	√	√		√	√	√			√	√	√	√	√	√
City of Northwest						√				√	√		√	√
City of Southport	√	√	√		√	√		√	√	√	√		√	√
City of Wilmington	√	√	√		√	√	√		√	√	√		√	√
New Hanover County	√	√	√	√	√	√		√	√	√	√	√	√	√
Onslow County	√		√	√	√	√			√	√	√	√	√	√
Pender County	√	√	√	√	√	√			√	√	√	√	√	√

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Town of Atkinson						√				√	√		√	√
Town of Belville	√	√	√		√	√			√	√	√		√	√
Town of Bolivia						√				√	√		√	√
Town of Burgaw						√				√	√		√	√
Town of Calabash	√	√	√		√	√			√	√	√		√	√
Town of Carolina Beach	√	√	√		√	√			√	√	√		√	√
Town of Carolina Shores	√	√	√			√				√	√		√	√
Town of Caswell Beach	√	√	√			√				√	√		√	√

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Town of Holden Beach	√	√	√			√				√	√		√	√
Town of Holly Ridge						√				√	√		√	√
Town of Kure Beach	√	√	√		√	√			√	√	√		√	√
Town of Leland	√	√	√		√	√			√	√	√		√	√
Town of Navassa	√	√	√		√	√				√	√		√	√
Town of North Topsail Beach	√	√	√	√	√	√			√	√	√		√	√
Town of Oak Island	√	√	√			√	√			√	√		√	√
Town of Ocean Isle Beach	√	√	√			√				√	√		√	√

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Town of Richlands	√				√	√				√	√		√	√
Town of Saint James	√	√	√			√				√	√		√	√
Town of Sandy Creek										√	√		√	√
Town of Shallotte	√	√	√			√				√	√		√	√
Town of Sunset Beach	√	√	√			√				√	√		√	√
Town of Surf City	√	√	√	√	√	√			√	√	√		√	√
Town of Swansboro	√	√	√	√	√	√	√		√	√	√		√	√
Town of Topsail Beach						√				√	√		√	√
Town of Varnamtown						√				√	√		√	√

Jurisdiction	Planners with knowledge of land development and land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Building Official	Emergency manager	Floodplain manager	Land surveyors	Scientist familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in Geographic Information Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services	Mutual Aid Agreements
Town of Watha						√				√	√		√	√
Town of Wrightsville Beach	√	√	√		√	√			√	√	√		√	√
Village of Bald Head Island	√	√	√			√				√	√		√	√
Village of Saint Helena						√				√	√		√	√

7.3.3 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone houses, which can require a substantial commitment from local, state, and federal funding sources.

The Capability Assessment captures information on the Region's fiscal capability through the identification of locally available financial resources.

Table 7.5 provides a summary of the results for the SENC Region with regard to relevant fiscal resources. A checkmark indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE 7.5: RELEVANT FISCAL RESOURCES

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Brunswick County	√	√									
City of Boiling Spring Lakes											
City of Jacksonville	√	√			√	√	√				√
City of Northwest											
City of Southport											
City of Wilmington	√	√	√		√	√	√	√	√		
New Hanover County	√	√			√	√	√				
Onslow County	√	√						√	√		√
Pender County	√	√									

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Town of Atkinson											
Town of Belville											
Town of Bolivia											
Town of Burgaw											
Town of Calabash											
Town of Carolina Beach					√	√	√				
Town of Carolina Shores											
Town of Caswell Beach											
Town of Holden Beach											
Town of Holly Ridge											
Town of Kure Beach					√	√	√	√	√	√	
Town of Leland											
Town of Navassa											
Town of North Topsail Beach	√	√	√					√	√	√	
Town of Oak Island											
Town of Ocean Isle Beach											
Town of Richlands	√	√					√	√	√	√	
Town of Saint James											
Town of Sandy Creek											
Town of Shallotte											
Town of Sunset Beach											

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Town of Surf City	√	√	√		√	√					√
Town of Swansboro	√	√	√			√		√	√	√	√
Town of Topsail Beach											
Town of Varnamtown											
Town of Watha											
Town of Wrightsville Beach					√	√	√				
Village of Bald Head Island											
Village of Saint Helena											

Source: Local Governments

7.3.4 Education and Outreach Capability

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. Examples include natural disaster or safety related school programs; participation in community programs such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns such as a Tornado Awareness Month.

Table 7.6 provides a summary of the results for the SENC Region with regard to relevant education and outreach resources. A checkmark indicates that the given resource is locally available for hazard mitigation purposes.

TABLE 7.6: EDUCATION AND OUTREACH RESOURCES

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency	Ongoing public education or information program (e.g., responsible water use, fire safety, household	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Brunswick County				√	√		√
City of Boiling Spring Lakes		√					
City of Jacksonville							
City of Northwest							
City of Southport							
City of Wilmington	√	√					
New Hanover County	√	√		√			√
Onslow County		√		√			√
Pender County				√			√
Town of Atkinson							
Town of Belville							
Town of Bolivia							
Town of Burgaw							
Town of Calabash				√			
Town of Carolina Beach	√	√					
Town of Carolina Shores							
Town of Caswell Beach							
Town of Holden Beach							
Town of Holly Ridge							
Town of Kure Beach	√	√					

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency	Ongoing public education or information program (e.g., responsible water use, fire safety, household	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Town of Leland							
Town of Navassa							
Town of North Topsail Beach							
Town of Oak Island							
Town of Ocean Isle Beach				√			
Town of Richlands							
Town of Saint James					√		
Town of Sandy Creek							
Town of Shallotte							
Town of Sunset Beach							
Town of Surf City							
Town of Swansboro							
Town of Topsail Beach							
Town of Varnamtown							
Town of Watha							
Town of Wrightsville Beach	√	√					
Village of Bald Head Island							
Village of Saint Helena							

7.3.5 Mitigation Capability

This type of local capability refers to the mitigation strategies and actions that are developed by the communities in this plan.

Table 7.7 provides a summary of the results for the planning area with regard to relevant mitigation resources. A checkmark (X) indicates that the given resource is locally available for hazard mitigation purposes.

TABLE 7.7: MITIGATION RESOURCES

Jurisdiction	Do you apply for mitigation grant funding?	Do you perform reconstruction projects?	Do you perform building elevations?	Do you perform acquisitions?
Brunswick County	√	√	√	√
City of Boiling Spring Lakes	√	√		
City of Jacksonville	√	√	√	√
City of Northwest				
City of Southport	√	√	√	√
City of Wilmington	√	√	√	√
New Hanover County	√	√	√	√
Onslow County	√	√	√	√
Pender County	√	√	√	√
Town of Atkinson				
Town of Belville				
Town of Bolivia				
Town of Burgaw	√	√	√	√
Town of Calabash	√	√	√	√
Town of Carolina Beach	√	√	√	√
Town of Carolina Shores	√	√	√	√
Town of Caswell Beach	√	√	√	√
Town of Holden Beach	√	√	√	√
Town of Holly Ridge				
Town of Kure Beach	√	√	√	√

Jurisdiction	Do you apply for mitigation grant funding?	Do you perform reconstruction projects?	Do you perform building elevations?	Do you perform acquisitions?
Town of Leland	√	√	√	√
Town of Navassa	√	√	√	√
Town of North Topsail Beach	√	√	√	√
Town of Oak Island	√	√	√	√
Town of Ocean Isle Beach	√	√	√	√
Town of Richlands				
Town of Saint James	√	√		
Town of Sandy Creek				
Town of Shallotte	√	√	√	√
Town of Sunset Beach	√	√	√	√
Town of Surf City	√	√	√	√
Town of Swansboro	√	√	√	√
Town of Topsail Beach	√	√	√	√
Town of Varnamtown				
Town of Watha				
Town of Wrightsville Beach	√	√	√	√
Village of Bald Head Island	√	√	√	√
Village of Saint Helena				

7.3.6 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority, or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies, as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Capability Assessment captures information on political capability of the SENC Region. Local governments were asked to identify some general examples of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (e.g., building codes, floodplain management, etc.). The comments provided by the participating jurisdictions are listed below:

- Onslow County's leadership is very strict on floodplain management. County planning continues to enforce programs to reduce hazard impacts and the County is working to ensure compliance in hazard mitigation.
- The City of Jacksonville has implemented policies, procedures and ordinances that support hazard mitigation. The City has a floodplain management plan with an assigned floodplain manager. The City has worked extensively in flood prone areas such as Shoreline Dr. to remove affected properties from hazard area. The City participates in code enforcement and plan review programs. The City has a Capital Improvement Plan that supports hazard mitigation with the new Jacksonville Marina being a prime example in addition to storm-water improvements. The City has an Emergency Operations Plan that is regularly reviewed and practiced. City council has illustrated their support for hazard mitigation through a resolution to join the SRHMP and through programs that waive fees during disaster recovery.
- The Town of Swansboro has taken proactive steps to develop several plans and programs which aid in the mitigation and reduction of hazards in our community.
  Those plans/programs are as follows:
  1. Regional Hazard Mitigation Plan in conjunction with the Onslow County Emergency Services Department (in process);
  2. Flood Damage Prevention Ordinance (Updated 2020);
  3. Watershed Restoration Plan (2017);
  4. CAMA Land Use Plan Update (2019);
  5. Stormwater Enterprise Fund (Collected Annually); and
  6. Emergency Operations Plan (Updated Annually).

  More information and copies of these plans can be found on our website at https://swansboro-nc.org/.
- Pender County has exhibited political commitment to reduce the impact of future hazard events through requiring two feet of freeboard in Special Flood Hazard Areas, applying for grant

funding to mitigate future risk to structures damaged by storms, and implementing the Pender 2.0 Comprehensive Land Use Plan which encourages the conservation of environmental features for their natural storm protection functions.

7.3.7 Local Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the Capability Assessment asked counties and local jurisdictions within the SENC Region to conduct a self-assessment of their perceived capability to implement hazard mitigation activities. As part of this process, local officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. Local government representatives classified each of the aforementioned capabilities as either "limited," "moderate," or "high."

Table 7.8 summarizes the results of the self-assessment for the SENC Region.

TABLE 7.8: SELF-ASSESSMENT OF CAPABILITY

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	OVERALL CAPABILITY
Brunswick County	High	High	High	Moderate	Moderate	High	High
City of Boiling Spring Lakes	High	Moderate	Limited	High	Unrated	Moderate	Moderate
City of Jacksonville	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
City of Northwest	Limited	Limited	Limited	Unrated	Unrated	Limited	Limited
City of Southport	High	High	Unrated	Unrated	Unrated	Unrated	Limited
City of Wilmington	Moderate	Moderate	Moderate	Unrated	Unrated	Moderate	Moderate
New Hanover County	Moderate	Moderate	Limited	Unrated	Unrated	Moderate	Moderate
Onslow County	High	High	Moderate	High	High	Moderate	Moderate
Pender County	Moderate	Moderate	Limited	Moderate	Moderate	Moderate	Moderate
Town of Atkinson	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Belville	Moderate	Moderate	Moderate	Unrated	Unrated	Moderate	Moderate

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	OVERALL CAPABILITY
Town of Bolivia	Limited	Limited	Moderate	Unrated	Unrated	Limited	Limited
Town of Burgaw	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Calabash	Moderate	Moderate	Moderate	Unrated	Unrated	Moderate	Moderate
Town of Carolina Beach	Moderate	Moderate	Moderate	Unrated	Unrated	Moderate	Moderate
Town of Carolina Shores	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Caswell Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Holden Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Holly Ridge	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Kure Beach	Limited	Limited	Limited	Unrated	Unrated	Limited	Limited
Town of Leland	Moderate	Moderate	Moderate	Unrated	Unrated	Moderate	Moderate
Town of Navassa	Limited	Limited	Limited	Unrated	Unrated	Limited	Limited
Town of North Topsail Beach	High	High	Moderate	Moderate	Moderate	High	High
Town of Oak Island	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Ocean Isle Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Richlands	Moderate	Moderate	Limited	Moderate	Moderate	Moderate	Moderate
Town of Saint James	Unrated	Limited	Limited	Unrated	Unrated	Moderate	Limited
Town of Sandy Creek	Limited	Limited	Limited	Unrated	Unrated	Limited	Limited
Town of Shallotte	Moderate	Limited	Moderate	Unrated	Unrated	Moderate	Limited
Town of Sunset Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Surf City	High	High	High	High	High	Moderate	High

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	OVERALL CAPABILITY
Town of Swansboro	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Town of Topsail Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Varnamtown	Limited	Limited	Limited	Unrated	Unrated	Limited	Limited
Town of Watha	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Town of Wrightsville Beach	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Village of Bald Head Island	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated
Village of Saint Helena	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated

7.4 CONCLUSIONS ON LOCAL CAPABILITY

As previously discussed, one of the reasons for conducting a Capability Assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified, for each jurisdiction, in the tables found throughout this section. The participating jurisdictions used the Capability Assessment as part of the basis for the mitigation actions that are identified in Section 9; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their mitigation actions.

SECTION 8
MITIGATION STRATEGY

This section of the plan provides the blueprint for the participating jurisdictions in the Southeastern NC Region to follow in order to become less vulnerable to their identified hazards. It is based on general consensus of the Southeastern NC Regional Hazard Mitigation Planning Committee and the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. It consists of the following five subsections:

- 8.1 Introduction
- 8.2 Mitigation Goals
- 8.3 Identification and Analysis of Mitigation Techniques
- 8.4 Selection of Mitigation Techniques for the Southeastern NC Region
- 8.5 Plan Update Requirement

8.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide the communities in the Southeastern NC Region with the goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

- In being *comprehensive*, the development of the strategy includes a thorough review of all hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the region achieve compatible economic, environmental, and social goals.
- In being *strategic*, the development of the strategy ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being *functional,* each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the

regulation of land in known hazard areas through a local ordinance) and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration, and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained over time.

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for the Southeastern NC Region (provided separately in Section 9: *Mitigation Action Plan*). Each county and participating jurisdiction has its own Mitigation Action Plan (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process. The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for Brunswick, New Hanover, Onslow and Pender counties and their municipal jurisdictions to complete.

Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Regional Hazard Mitigation Plan.

In preparing each Mitigation Action Plan for the Southeastern NC Region, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mitigation goals and unique needs of the community.

8.1.1 Mitigation Action Prioritization

All existing mitigation actions found in the Mitigation Action Plan were previously prioritized by the participating jurisdictions. For the 2021 update of the plan the members of the Regional Hazard Mitigation Planning Committee were asked, as part of the process of providing a status update for each action, to make sure that the assigned priority for each action was still appropriate. Prioritization of the proposed mitigation actions was based on the following strategies:

1. High Priority – Highly cost-effective, administratively feasible and politically feasible strategies that should be implemented in fiscal years 2020/2021 and 2021/2022 and be continued.
2. Medium Priority – Strategies that have at least two of the following characteristics (but not all three) and should be implemented in fiscal years 2021/2022 to 2022/2023:
    a. Highly cost-effective; or
    b. Administratively feasible, given current levels of staffing and resources; or
    c. Are politically popular and supportable given the current environment.

3. Low Priority – Strategies that have at least one of the following characteristics (but not two or three) and should be implemented in the next five (5) years (by the end of 2025/2026):
    a. Highly cost-effective; or
    b. Administratively feasible, given current levels of staffing and resources; or
    c. Are politically popular and supportable given the current environment.

The point of contact for each county helped coordinate the prioritization process by reviewing each action and working with the lead agency/department responsible to determine a priority for each action using the factors listed above.

As the actions were reviewed as part of the 2021 update of the plan, each community was asked to review the priority assigned to each action and ensure that the priority had not changed. If the priority of a particular action did change, the participating jurisdictions were asked to revise those priorities accordingly using same criteria as defined above.

8.2 MITIGATION GOALS

44 CFR Requirement
44 CFR Part 201.6(c)(3)(i): The mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, Brunswick, New Hanover, Onslow and Pender counties and the participating municipalities have developed five goal statements for local hazard mitigation planning in the region. In developing these goals, the project consultant reviewed the goals from the previous plan and discussed them with the Regional Hazard Mitigation Planning Committee.

The proposed regional goals were presented, reviewed, voted upon, and accepted by the Regional Hazard Mitigation Planning Committee at their second meeting. Minimal revisions to the wording of the goals were made. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more mitigation actions. The Southeastern NC Regional Mitigation Goals are presented in **Table 8.1**. Consistent implementation of actions over time will ensure that community goals are achieved.

As part of the development of the 2021 update of this plan, the goals found in Table 8.1 were reviewed and discussed at the 2/11/20 meeting of the Regional Hazard Mitigation Planning Committee. It was determined that the goals are still applicable for the region and only minor revisions to the wording of the goals were recommended. Onslow County representatives agreed to have the goals from their previous plan replaced with these goals.

TABLE 8.1: SOUTHEASTERN NC REGIONAL MITIGATION GOALS

	Goal
Goal #1	Work to improve existing local government policies and codes to reduce impacts of natural hazards.
Goal #2	Design and implement specific mitigation measures to protect vulnerable public and private properties.

	Goal
Goal #3	Increase the protection of critical facilities and infrastructure from hazard threats through retrofit projects for existing facilities and innovative design standards for new facilities.
Goal #4	Enhance public education programs to promote community awareness of natural hazards and the hazard mitigation techniques available to reduce their impact.
Goal #5	Improve stormwater management through enhanced local government programs, policies, and practices.
Goal #6	Enhance each county's storm evacuation procedures through increased intergovernmental coordination between the Counties, the participating municipalities, and the State of North Carolina.
Goal #7	Increase the County's emergency management capabilities through sustained system and technology improvements.
Goal #8	Promote volunteer involvement in emergency preparedness and response through increased citizen awareness and training activities.

8.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

44 CFR Requirement
44 CFR Part 201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In formulating the Mitigation Strategy for the Southeastern NC Region, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the Southeastern NC Regional Hazard Mitigation Planning Committee meetings. In general, all activities considered by the Regional Hazard Mitigation Planning Committee can be classified under one of the following six broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

8.3.1 Prevention

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning
- Building codes

- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Riverine / Shoreline / fault zone setbacks

Each of the prevention mitigation techniques is described in more detail in the Capability Assessment section (Section 7).

8.3.2 Property Protection

Property protection measures involve the modification of a site or the modification of existing buildings and structures to help them keep the hazard away or better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Modification of the site to keep the hazard from reaching the building
  - Flood Barriers
  - Relocation
  - Building Elevation
  - Demolition
  - Demo/Rebuild
- Modify the building (retrofit) so it can withstand impacts of the hazard
  - Windproofing
  - Dry Floodproofing
  - Wet Floodproofing
  - Seismic design techniques
- Critical facilities protection
- Safe rooms, shutters, shatter-resistant glass
- Insurance (private property and public property)

Site Modification

Flood Barriers

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed to ensure that it does not create additional flooding or drainage problems on neighboring properties. Depending on how well the ground drains, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or French drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier. However, barriers can only be built so high and they can be overtopped by a flood higher than expected.

Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained.

Relocation

Moving a flood-prone building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new location available outside of the hazard zone.

Building Elevation

Elevating a building above the flood level can be almost as effective as moving it out of the floodplain. Once the building is raised, water is allowed to flow under and around the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation. Building elevation protects the physical building but does not eliminate life safety or rescue needs during a flood event.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, may not be the expense to protect them from future damages. In some cases, it is cheaper to demolish them and either replace them with new, flood protected structures, or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move – such as larger, slab foundation or masonry structures – and for dilapidated structures that are not cost-beneficial to protect.

Demolition/Rebuild

If a building is not in good shape, elevating it may not be feasible or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood protection codes. However, it can be difficult to qualify for the FEMA funding to implement this technique and it is not a regularly funded option. Certain rules must be followed to qualify for federal funds for pilot reconstruction.

Site Modification (Retrofitting)

Dry Floodproofing

Dry floodproofing is a mitigation practice whereby one makes all areas of a structure below the flood protection level watertight. Dry floodproofing can be achieved by coating wall with waterproofing compounds or plastic sheeting. Additionally, openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. There are no restrictions for dry floodproofing buildings located outside the regulatory floodplain.

Dry floodproofing is only effective for areas of shallow flooding, such as areas with repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes

or other storms or velocity flooding where floodwaters move swiftly and can damage the dry floodproofing materials.

Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let into the structure and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. Mechanical fixtures such as the furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Insurance

Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the National Flood Insurance Program. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area. Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

8.3.3 Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Wetland protection
- Erosion and sediment control
- Watershed management
- Stream/River Restoration
- Best Management Practices
- Dumping Regulations
- Farmland Protection

- Forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.)
- Habitat preservations
- Slope stabilization

Wetland Protection

Wetlands are often synonymous with floodplains and topographically depressed areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter and helps improve water quality, and they provide habitat for many species of fish, wildlife and plants. The Southeastern NC Region is characterized by many acres of wetlands.

Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil. Sediment suspended in the water tends to settle out where flowing water slows down. This sediment can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices. Many of the participating jurisdictions in the Southeastern NC Region have adopted Erosion and Sedimentation Control Ordinances and/or Stormwater Management Ordinances that address some of these issues.

Stream/River Restoration

There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.
A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion

- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities. Many of the Stormwater Management Ordinances that are in place in the SENC Region contain regulations for stormwater BMPs. Because of the SENC Region's unique geologic and hydrologic conditions (i.e., poorly drained soils and a shallow water table), the types of appropriate BMPs that can be effectively utilized in the region are limited.

Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

In addition, many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regrading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Farmland Protection

Farmland protection is an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land.

8.3.4 Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Dams / levees / dikes / floodwalls
- Diversions / detention / retention
- Channel modification
- Storm sewers

Levees and Floodwalls

Probably the best-known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. However, they must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

8.3.5 Emergency Services

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection
- Installing temporary shutters for wind protection

Threat Recognition

The first step in responding to a flood is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated. The National Weather Service (NWS) is the prime agency for detecting meteorological threats. Severe weather warnings are transmitted through NOAA's Weather Radio System. Local emergency managers can then provide more site-specific and timely recognition after the Weather Service issues a watch or a warning. A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On smaller rivers and streams, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Warning

The next step in emergency response following threat recognition is to notify the public and staff of other agencies and critical facilities. More people can implement protection measures if warnings are early and include specific detail.

The NWS issues notices to the public using two levels of notification:

- Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
- Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- CodeRED countywide mass telephone emergency communication system
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should include a public information component.

StormReady

The National Weather Service (NWS) established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises

Being designated a NWS StormReady community is a good measure of a community's emergency warning program for weather hazards. As documented in the Capability Assessment section of this plan, there are six StormReady communities in the SENC Region.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness)
- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Passing out sand and sandbags (public works)
- Holding children at school or releasing children from school (school superintendent)
- Opening evacuation shelters (the American Red Cross)
- Monitoring water levels (public works)
- Establishing security and other protection measures (police)

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Evacuation and Shelter

There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled persons, prisoners, hospital patients, schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff shelters and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a

specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

8.3.6 Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series / demonstration events
- Hazard map information
- Real estate disclosure
- Library materials
- School children educational programs
- Hazard expositions

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties. Awareness of the hazard is not enough; people need to be told what they can do about the hazard.

Thus, projects should include information on safety, health and property protection measures. Research has shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources. Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government.

Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet. Some examples of resources that can be found online include, but are not limited to, floodplain maps, information for homeowners on how to retrofit for floods and flood information for children.

Technical Assistance

Hazard Information

Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Communities can easily provide map information from FEMA's FIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never flood.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track. Building or public works department staffs can provide the following types of assistance:

- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation, and
- Explain when building permits are needed for home improvements.

Public Information Program

A Program for Public Information (PPI) is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A PPI consists of the following parts, which are incorporated into this plan:

- Description of the local flood hazard,
- The property protection measures appropriate for the flood hazard,
- Flood safety measures appropriate for the local situation,

- The public information activities currently being implemented within the community, including those being carried out by non-government agencies,
- Goals for the community's public information program,
- The outreach projects that will be done each year to reach the goals, and
- The process that will be followed to monitor and evaluate the projects.

8.4 SELECTION OF MITIGATION TECHNIQUES FOR THE SOUTHEASTERN NC REGION

In order to determine the most appropriate mitigation techniques for the communities in the Southeastern NC Region, the Regional Hazard Mitigation Planning Committee members thoroughly reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment* to determine the best activities for their respective communities. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

8.5 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous SENC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan were evaluated to determine their 2021 implementation status. Updates on the implementation status of each action are provided. Any changes to the relative priority of the actions are noted as well. The mitigation actions provided in Section 9: *Mitigation Action Plan* include the mitigation actions from the previous plans as well as any new mitigation actions proposed through the 2021 planning process. Actions identified as completed in the 2016 version of the plan have been moved to Appendix E.

SECTION 9
MITIGATION ACTION PLAN

This section includes the listing of the mitigation actions proposed by the participating jurisdictions in the Southeastern NC Region. It consists of the following two subsections:

- 9.1 Overview
- 9.2 Mitigation Action Plans

44 CFR Requirement

44 CFR Part 201.6(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

9.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy* and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for the Southeastern NC Region. Each action is listed in the MAP in conjunction with background information such as hazard(s) addressed, relative priority, and estimated cost. Other information provided in the MAP includes potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the Southeastern NC Regional Hazard Mitigation Plan remains a functional document that can be monitored for progress over time. The proposed actions are not listed in priority order, though each has been assigned a priority level of "high," "moderate," or "low" as described below and in Section 8 (page 8.2).

The Mitigation Action Plan is organized by mitigation strategy category (Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, or Public Education and Awareness). The following are the key elements described in the Mitigation Action Plan:

- Hazard(s) Addressed—Hazard which the action addresses.
- Relative Priority—High, moderate, or low priority as assigned by the jurisdiction.
- Lead Agency/Department—Department responsible for undertaking the action.
- Potential Funding Sources—Local, State, or Federal sources of funds are noted here, where applicable.
- Implementation Schedule—Date by which the action the action should be completed.

More information is provided when possible.

- Implementation Status (2021)—Indication of completion, progress, deferment, or no change since the previous plan. If the action is new, that will be noted here.

9.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in the MAPs on the following pages. **Table 9.1** shows the location of each jurisdiction's MAP within this section as well as the number of mitigation actions proposed by each jurisdiction. For Brunswick, New Hanover and Pender Counties, county-wide actions that apply to most of the jurisdictions in the County are provided. For the 2021 implementation status update, each municipality for which an action was applicable provided an update on the status of implementation for that action.

TABLE 9.1: INDIVIDUAL MAP LOCATIONS

Location	Page	Number of Mitigation Actions
Brunswick County	**9:4**	**56**
Bald Head Island	9:4 and 9:80	53 countywide + 2 additional
Belville	9:4	53 countywide
Boiling Spring Lakes	9:4 and 9:81	53 countywide + 10 additional
Bolivia	9:4	53 countywide
Calabash	9:4	53 countywide
Carolina Shores	9:4	53 countywide
Holden Beach	9:4 and 9:82	53 countywide + 1 additional
Leland	9:4	53 countywide
Navassa	9:4	53 countywide
Northwest	9:4 and 9:83	53 countywide +1 additional
Oak Island	9:84	17
Ocean Isle Beach	9:4 and 9:89	53 countywide + 3 additional
Sandy Creek	9:4	53 countywide
Shallotte	9:90	53
Southport	9:104	51
St. James	9:4	53 countywide
Sunset Beach	9:4 and 9:119	53 countywide + 4 additional
Varnamtown	9:4	53 countywide
New Hanover County	**9:120**	**41**
Carolina Beach	9:120	41 countywide
Kure Beach	9:120	41 countywide
Wilmington	9:120 and 9:146	41 countywide + 3 additional
Wrightsville	9:120	41 countywide
Onslow County	**9:147**	**39**
Holly Ridge	9:155	20
Jacksonville	9:157	24
North Topsail Beach	9:163	32
Richlands	9:168	21
Swansboro	9:172	26
Pender County	**9:177**	**34**

Location	Page	Number of Mitigation Actions
Atkinson	9:177	34 countywide
Burgaw	9:177	34 countywide
St. Helena	9:177	34 countywide
Surf City	9:177	34 countywide
Topsail Beach	9:177	34 countywide
Watha	9:177	34 countywide

Note: In the previous version of the plan, Brunswick County and the municipalities within the County combined many of their mitigation action plans into County-wide actions that covered all municipalities. For this update, some of the municipalities have decided, once again, to have their own, municipally-specific mitigation action plan. Specifically, this is relevant for Oak Island, Shallotte and Southport.

Brunswick County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BC1	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also outline sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated on these issues to work with prospective builders.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Planning, Brunswick Co Emergency Services Municipal Administrations	General Funds	2026	Brunswick County: Completed – the County recently hired a Flood Plain Administrator who informs the public of flood plain hazards and maintains a library of educational materials for citizens. Bald Head Island: Bald Head Island participates in the NFIP's Community Rating System program and adopted a Program for Public Information (PPI) in April 2020. Belville: Library of materials if continuously available. Boiling Spring Lakes: Completed – Floodplain Administrator is a Certified Floodplain Manager and maintains a library of educational material both at City Hall and on the City website. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. Holden Beach: See update provided by the County. Leland: Completed; ongoing. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC2	Continue/expand efforts to partners with area utility districts to encourage proper development of regional water and sewer systems.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes,	Brunswick Co Administration Brunswick Co Sewer Districts Municipal Administrations	General Funds, NCDPS, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Bald Head Island: See update provided by the County. Belville: Extensive partnership and operating agreement with H2GO Boiling Spring Lakes: Completed – part of day-to-day activities by coordinating with Brunswick County on all new water & sewer systems Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town has not carried out this strategy, but intends to carry it out as funding becomes available. The Town has worked closely with local water and sewer districts over the last five years to ensure access to a potable water supply. Holden Beach: See update provided by the County. Leland: Ongoing. Cooperative agreement between H2Go, Belville, and Leland has not been reached as of 2/27/2020. Navassa: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC3	When possible, ensure that no public and/or critical facilities are proposed for flood hazard areas. Additionally, when siting new public/critical facilities, the information and data outlined in this plan will be factored into the decision-making process.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Continuously work with Brunswick County as they conduct flood plain administration. Belville works with them during the permitting process. Boiling Spring Lakes: Completed – part of day-to-day activities during review process to ensure critical facilities are not proposed for flood hazard areas Bolivia: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Municipal wastewater, EOC, fire stations, and other critical infrastructure is sited outside of flood hazard areas. New infrastructure will also be sited outside of hazardous areas including flood zones to the maximum extent practicable. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BC4	In coordination with participating municipal jurisdictions, continue to accept gifts/donations of land located in hazard areas or rendered unbuildable by storms or other events, for the purpose of shorefront access.	Flood, Erosion	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Brunswick County gave the Town of Belville the land in which has since been developed into Brunswick Riverfront Park at Belville. It includes a nature walk, and outdoor education center, and an observation deck that overlook the Brunswick River Boiling Spring Lakes: See update provided by the County. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland has accepted donations of, purchased, and condemned properties in flood hazard and flood

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								prone areas, with intentions to use as recreation areas with limited, if any, development. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BC5	In conjunction with annual EOP updates, determine if access to all critical facilities is readily available in the event of a natural hazard event. Careful consideration should be given to localized flooding issues that may restrict access along limited access thoroughfares. Where access issues are identified, establish a plan for alternative transportation.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Operations Center, Municipal Administrations	General Funds	2026	Brunswick County: Brunswick County continuously updates emergency plans and procedures and works with facility partners to ensure critical facilities are accessible in the event of natural disasters. Contingency plans are implemented when needed. Bald Head Island: Bald Head Island updated its EOP to include rental of high-water vehicles. Belville: The Town has a Hurricane Plan (to be updated soon) and works with Brunswick County emergency management. Boiling Spring Lakes: Completed – detours established; new infrastructure in place; pumps located in areas subject to flooding Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town reviews and updates the local emergency response procedures in conjunction with Brunswick County emergency management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies. This

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland continues to implement new road interconnectivity to alleviate access impediments due to flooding. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC6	Maintain County and Town Stormwater Ordinances in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements. These efforts should also include analysis of stormwater hotspots and potential remedies for these issues.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina	Brunswick Co Administration Municipal Administrations	General Funds, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Bald Head Island: See update provided by the County. Belville: Adopted Brunswick County stormwater ordinance Boiling Spring Lakes: Deferred – continuously implemented - stormwater permits required for all projects over 1 acre and all commercial development; Stormwater Master Plan currently being developed Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town has not accomplished this strategy; however, the Town will consider changes to land development regulations that will assist with mitigation efforts. The Town has collaborated with the County and NCDEQ to increase standards related to stormwater runoff. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Navassa: See update provided by the County.

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								Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC7	Consider submitting an application to join the Community Rating System using Hazard Mitigation components to fulfill application requirements.	Flood	High	Brunswick County, Belville, Boiling Spring Lakes, Bolivia, Carolina Shores, Leland, Navassa, Northwest, Sandy Creek, St. James, Varnamtown	Brunswick Co Administration Municipal Administrations NCDPS	General Funds, NCDPS	Completed for Brunswick County – for those municipalities still considering joining the CRS, their implementation schedule will be before the next plan update in 2026.	Brunswick County: Completed The County joined the CRS and was awarded a Class Rating 8. The County will continue working to maintain or improve the rating. Belville: The Town has considered and is interested in submitting an application Boiling Spring Lakes: Deferred until completion of HMPG project to rebuild dams Bolivia: Bolivia is still considering joining the CRS. Carolina Shores: Carolina Shores is still considering joining the CRS. Leland: Pending. Leland is taking steps to finalize FEMA Community Assistance Visit issues and concurrently establishing a plan to apply to CRS, with a target goal of

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Fall 2020 to become a CRS community. Navassa: Navassa is still considering joining the CRS. Northwest: Northwest does not have the capacity nor the number of flood insurance policies within the town to justify joining the CRS. Sandy Creek: Sandy Creek does not have the capacity nor the number of flood insurance policies within the town to justify joining the CRS. St. James: St. James is still considering joining the CRS Varnamtown: Varnamtown does not have the capacity nor the number of flood insurance policies within the town to justify joining the CRS.
BC8	Review respective Comprehensive Land Use Plans annually to ensure that the Future Land Use Maps adequately delineates portions of the County/ municipalities deemed unsuitable for development due to existing environmental conditions or other factors outlined in this plan.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James,	Brunswick Co Planning Municipal Administrations	General Funds, NCDPS, NCDEQ	2026	Brunswick County: Deferred The County is currently drafting a new and updated Future Land Use Plan to meet goals within this action item. Bald Head Island: See update provided by the County. Belville: Works with Brunswick County to update as needed Boiling Spring Lakes: Completed – Planning Administrator consults the plan as a basis for making recommendations to the planning board and governing board. Bolivia: See update provided by the County.

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				Sunset Beach, Varnamtown				Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland's last land use plan update was performed in 2016. Money has been budgeted in FY2020-21 for a comprehensive land use plan that will analyze land suitability for development based on environmental constraints including wetlands and flood prone areas. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

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BC9	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events. Additionally, jurisdictions with freeboard requirements adopted at the local level will continue to enforce these minimum standards (Brunswick County freeboard requirements is two feet above BFE).	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick County Administration, Municipal Administrations	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: In 2019, Brunswick County FDPO was updated and adopted in 2019 to comply up-to-date State and Federal requirements. This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Completed. Ordinance passed last year Boiling Spring Lakes: Completed – updated FDPO adopted in 2018; 2' freeboard requirement enforced by Floodplain Administrator/Planning Administrator Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed. Updated FDPO adopted for Leland in conjunction

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								with updated FIRMS in Fall 2019. Leland retains a 2' freeboard requirement. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC10	Periodically evaluate local land development regulations for ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.	Flood	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration, Municipal Administration	General Funds	2026	Brunswick County: Deferred Upcoming FLUP and text amendments to reflect recommendations in the FLUP Bald Head Island: See update provided by the County. Belville: The Town will be updating Vision 2020 Plan soon to incorporate these elements. Boiling Spring Lakes: Completed – Planning Administrator periodically evaluates development regulations and consults the Comprehensive Land Use Plan and Brunswick County Public Utilities when making

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								recommendations to the planning board and governing board Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: Accomplished in 2019 with the creation of the Conservation Zone. The waters leading into the ICW are now protected by zoning restrictions. Additionally, the Zoning Ordinance was updated in 2013 and will be enforced moving forward. Holden Beach: See update provided by the County. Leland: Ongoing and deferred. Leland continues to perform ordinance updates when necessary but intends to revisit land use regulations after a comprehensive land use plan project which is pending to begin in Fall 2020. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County.

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								St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC11	Work closely with NCDOT and the Cape Fear Regional Metropolitan Planning Organization (MPO) to improve road access standards and protect the integrity of significant traffic-carrying roadways throughout the County. These efforts should specifically target the issue of restriping highway intersections and lane markings for higher visibility.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations, NC Department of Transportation Cape Fear Regional MPO	General Funds, NCDOT	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: The Town of Belville participates on all levels of involvement with the Wilmington MPO. The Town has representation on the following WMPO boards: Transportation Advisory Committee, The Technical Coordinating Committee, and the Bicycle & Pedestrian Advisory Committee. Boiling Spring Lakes: Completed – part of day-to-day activities – all development plans proposed on State roads sent to NCDOT for review; evacuation routes clearly established; Pedestrian Planning Grant obtained; lane and intersection markings to be done will all repaving projects on secondary and collector roads

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								Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town continues to collaborate with the County and NCDOT to address this issue. Some progress has been made; however, it continues to be an issue. Holden Beach: See update provided by the County. Leland: Ongoing. Leland participates in transportation planning and project prioritization with the Wilmington MPO. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

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BC12	Continue to consider incorporating the concept of cluster subdivision development into the County's subdivision regulations. Employing this development option, if adopted, will provide for a development pattern which minimizes impacts on environmentally sensitive portions of the County, including floodplains.	All	Moderate	Brunswick County	Brunswick Co Planning Brunswick Co Administration	General Funds, NCDEQ	Action deleted during 2021 plan update.	This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates.
BC13	Review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS, FEMA	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: See update provided by the County. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town addresses this issue on an ongoing basis. Holden Beach: See update provided by the County.

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								Leland: Completed and ongoing. Leland's updated flood damage prevention ordinance was adopted post-Florence and took into consideration additional and higher standards. New development is encouraged to limit development and disturbance in flood hazard areas. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC14	Maintain all FEMA Elevation Certificates, FEMA Floodproofing Certificates for non-residential structures, and where applicable, a V Zone Design Certificate for all structures built or floodproofed since application to the CRS. V Zone Design Certification must be maintained only for structures built subsequent to January 1, 2013.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland,	Brunswick Co Planning Municipal Administrations	General Funds	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County.

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				Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Belville: The Town keeps as many certifications as possible. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Ongoing. Leland had a computer server crash in 2006 and lost some Elevation Certificates; this was realized during the recent FEMA CAV. Leland intends to contract to perform elevation surveys on some structures for which no ECs are on file or available. Leland also is working to georeference all available ECs into a GIS map. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County.

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								St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC15	Review written policies on water and sewer system extensions and tap on policies to ensure that the County is adequately addressing and discouraging inappropriate development in sensitive environmental areas and areas prone to flood or storm surge hazards.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Brunswick Co Sewer Districts Municipal Administrations	General Funds, Sewer Districts	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Brunswick County Hazard Mitigation Plan, Brunswick County Stormwater Ordinance, and this Mitigation Action Plan Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town has not carried out this strategy, but intends to carry it out as funding becomes available

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								Holden Beach: See update provided by the County. Leland: Ongoing Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC16	Consider the data and recommendations outlined in this plan when preparing updates to Capital Improvements Plans. All recommendations regarding capital expenditures will focus on siting all infrastructure and public facilities outside of the Flood Hazard Area.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach,	Brunswick Co Administration Municipal Administrations	General Funds	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Capital Outlay section of the budget Boiling Spring Lakes: Completed – part of day-to-day activities

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				Sandy Creek, St. James, Sunset Beach, Varnamtown				Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town has not carried out this strategy, but intends to carry it out as funding becomes available. Holden Beach: See update provided by the County. Leland: Ongoing Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC17	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of	Flood	Low	Brunswick County, Bald	Brunswick Co Administration Municipal	General Funds, NCDPS, NCDEQ	Completed	Brunswick County: Action completed.

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	development. These efforts will be incorporated into the comprehensive planning process.			Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Administrations			Flood Plain Administrator inventoried existing structures upon the recent flood map adoption on 7/31/20. Bald Head Island: See update provided by the County. Belville: The Town is interested in setting up a GIS database in which this will be one of the layers. Boiling Spring Lakes: Deferred (funding for mapping software, lack of staff) Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. Holden Beach: See update provided by the County. Leland: Deferred due to staffing constraints. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County.

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								Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC18	Support commercial forestry activities, provided significant adverse impacts on natural resource systems are fully mitigated. Such activities should be considered in accordance with the standards and recommendations of the US Forest Service. The County also advocates the voluntary participation of commercial forestry interests in the State of North Carolina's best management practice program for forestry management.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, James, Sunset Beach, Varnamtown	NC Forest Service, Brunswick Co Emergency Services Municipal Administrations	General Funds, NCFS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: This action is not applicable for the Town of Belville as they do not have any commercial forestry activities Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County.

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								Holden Beach: See update provided by the County. Leland: Leland has taken no action on this item and probably does not intend to. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC19	Continue to support beach municipalities in maintenance/protection of beaches as well as protecting shorelines under County jurisdiction.	Erosion	High	Bald Head Island, Caswell Beach, Holden Beach, Ocean Isle Beach, Sunset Beach	Municipal Administrations	General Funds, USACE	Action deleted during 2021 plan update.	Brunswick: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Caswell Beach: See update provided by the County.

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								Holden Beach: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sunset Beach: See update provided by the County.
BC20	Continue to require 404 wetlands and 100-year floodplain areas to be delineated on all preliminary subdivision plats for lands within and adjacent to the proposed subdivision.	Flood	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Brunswick Co Emergency Operations Center, NCDEQ	General Funds, NCDPS, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: The Town will continue to require 404 wetlands and 100-year floodplain delineation. Is in the subdivision ordinance. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: Accomplished in 2091 with the creation of the Conservation Zone. The waters leading into the ICW are now protected by zoning restrictions.

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								Holden Beach: See update provided by the County. Leland: Completed and ongoing Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC21	Continue to undertake the following actions to support maintenance of safe hurricane evacuation routes: Identify and support improvements to roads that serve as hurricane evacuation routes, post evacuation routes on County and Town websites, perform routine bridge and culvert maintenance, and raise bridges over streams that have documented flooding during significant rain events, support the planning and implementation of regional roadways	Hurricane	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach,	Brunswick Co Emergency Operations Center, Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: All evacuation routes have been mapped by the Brunswick County GIS department and are reviewed and updated annually as needed. The County will continue to address this issue through annual Emergency Operations Plan updates. Bald Head Island: See update provided by the County. Belville: Hurricane Plan currently in place; needs to be updated. Boiling Spring Lakes: Deferred – continuously implementing – current HMGP project to rebuild

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				Sandy Creek, St. James, Sunset Beach, Varnamtown				dams; Stormwater Master Plan being developed Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies. This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation. Holden Beach: See update provided by the County. Leland: Ongoing. Leland participates in transportation planning and project prioritization with the Wilmington MPO. Identification and posting of hurricane evacuation routes on the Town website is pending.

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								Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC22	Continue to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of freshwater swamps, marshes, and 404 wetlands.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations NCDEQ	General Funds, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Partners with US ACE and refers to CAMA Plan as needed. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County.

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								Carolina Shores: See update provided by the County. Caswell Beach: Accomplished in 2091 with the creation of the Conservation Zone. The waters leading into the ICW are now protected by zoning restrictions. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC23	Support the relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations. Additionally, the issue of tax base loss should be taken into account within municipal jurisdictions.	Landslide	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina	Brunswick Co Planning NCDPS	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates.

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				Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Bald Head Island: See update provided by the County. Belville: Support and work with property owners and the floodplain administrator. Review flood damage prevention ordinance. Boiling Spring Lakes: See update provided by the County. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: N/A – there are no structures in Leland that are vulnerable to erosion. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County.

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								St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC24	Continue to enforce respective flood damage prevention ordinances and participate in the National Flood Insurance Program. Subdivision regulations will be enforced – requiring elevation monuments to be set so that floodplain elevations can be more easily determined. Additionally, municipalities with freeboard requirements shall continue to enforce this standard locally.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Planning Brunswick Co Administration	General Funds	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: Bald Head Island added a one-foot freeboard requirement to its Flood Damage Prevention Ordinance in December 2019. Belville: Flood Ordinance adopted in 2019. Additionally, the Town adopted an interlocal agreement with Brunswick County for flood. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County.

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								Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland enforces its FDPO, including 2' freeboards standard, participates in the NFIP, and is working on joining the CRS. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC25	Continue to support the guidelines of the Coastal Area Management Act and the efforts and programs of the NC Department of Environmental Quality, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of Brunswick County.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland,	Brunswick Co Administration Municipal Administrations	General Funds, NCDEQ	2026	Brunswick County: Deferred CAMA compliant Future Land Use Plan is in the early stages of being drafted Bald Head Island: See update provided by the County. Belville: Support Brunswick County Boiling Spring Lakes: See update provided by the County

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				Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland is currently working with DCM to have a Town staff person designated as a Local Permit Officer. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC26	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties	Flood	High	Brunswick County, Bald	Brunswick Co Administration	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the

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	(RLPs) from future flood events. The County will maintain a list of RLPs and, on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The County will assist all municipal jurisdictions in working through the structural mitigation grant funding process.			Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Municipal Administrations			County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Support Brunswick County with their efforts. Boiling Spring Lakes: Deferred (lack of staff) Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Ongoing. Leland has coordinated with Brunswick County for application for grant funding for repetitive loss buyback. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County.

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								Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC27	Integrate publicly acquired land into public park and greenway systems. These efforts may be carried out through update of the County Blue/Greenway system, as well as municipal planning efforts.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds, NCDEQ, NCDOT	2026	Brunswick County: Deferred Upcoming NC211 Corridor Study for the East Coast Greenway Plan is currently being drafted Bald Head Island: See update provided by the County. Belville: Belville developed a Brunswick Riverwalk Park Site Specific Master Plan to guide the development of the park. Currently, Phase I is almost complete. Belville participates on the WMPO's Bicycle and Pedestrian Advisory Committee. Boiling Spring Lakes: Deferred – continuously implementing; acquired land at North Lake Park; Pedestrian Planning Grant being developed Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County.

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								Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Several municipal parks also serve as floodplain mitigation and riparian buffers – Cypress Cove Park, Sturgeon Creek Park, and Westgate Nature Park. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC28	Continue to enforce the NC State Building Code. Local government inspections staff will recertify the NC State Building Code as the adopted local regulation applying to all construction activities on an annual basis. Through enforcement of the NC State Building Code, jurisdictions will work to ensure that all structures, including manufactured homes, are	Flood, Landslide	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina	Brunswick Co Inspections Municipal Inspections	General Funds	Action deleted during 2021 plan update.	Brunswick County: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in

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	properly anchored to minimize potential impacts stemming from a disaster event.			Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: Bald Head Island actively enforces the building code and adopt amendments and changes as required. Belville: Brunswick County handles the Town's inspections. Belville will continue to support the County through an interlocal agreement. Belville also has adopted a minimum housing code ordinance. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: Caswell Beach actively enforce the building code and adopt amendments and changes as required. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland currently has 6 full time building inspector positions, which includes the Chief Building Official who is also a Certified Floodplain Manager.

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								Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC29	Consider a policy for contractors to pick up building material and building debris prior to coastal storms.	Hurricanes and Coastal Hazards	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds, FEMA	2026	Brunswick County: Deferred Need to review and coordinate with other county departments to generate policy and educational material. Bald Head Island: See update provided by the County. Belville: Outlined in the Hurricane Plan. All debris and port-o-johns must be removed. Boiling Spring Lakes: Deferred – to review and incorporate with appropriate departments to generate written policy and education material. Bolivia: See update provided by the County.

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								Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Deferred due to staff constraints. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC30	Continue to enforce minimum housing code to require the improvement of substandard housing.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina	Brunswick Co Administration Municipal Administrations	General Funds	2026	Brunswick County: Deferred Lack of funding. Seeks additional funding sources for positions to address these deficiencies Bald Head Island: See update provided by the County.

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				Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Belville: Brunswick County handles the Town's inspections. Belville will continue to support the County through an interlocal agreement. Belville also has adopted a minimum housing code ordinance. Boiling Spring Lakes: Deferred – draft minimum housing code completed and committee being established for review and comment. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland has and enforces a minimum housing code and responds to citizen complaints about dilapidated structures. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County.

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								Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC31	Continue providing density credits for developments that establish perpetual easements for ecologically sensitive lands.	All	Low	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County through our Exceptional design provisions within the UDO. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: In the subdivision ordinance, there is guidance regarding density units per acre and the percentage of minimum open space that is required. Boiling Spring Lakes: Ongoing – ordinance addresses density and open space requirements, but does not address density credits. Bolivia: See update provided by the County. Calabash: See update provided by the County.

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								Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Pending. Leland is currently drafting a conservation ordinance that would limit or prohibit development or disturbance in wetlands and flood hazard areas, and potentially offer higher density allowances for such preservation. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC32	Enhance and develop new public accesses to waterway resources in a manner as to protect sensitive environment areas from development and implement the priority recommendations contained in the Brunswick County Shoreline Access Plan.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes,	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Deferred Brunswick County Shoreline Access Plan needs to be reviewed and updated. Last update was in 1990

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				Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Bald Head Island: See update provided by the County. Belville: The Town of Belville is currently applying for grant funds to install a non-motorized boat launch for canoes, kayaks, row boats, and paddleboards; and to replace the damaged boat dock at the motorized boat ramp. Boiling Spring Lakes: No update provided for this action Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Cypress Cove Park offers public water access for kayaks and other nonmotorized boats, as well as significant riparian buffer. Leland has acquired several properties for Sturgeon Creek Park and undergone significant design planning. The park will feature low impact development and Leland has partnered with NC WRC for a boat ramp at this park.

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								Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC33	Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of flood-prone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials).	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Operations Center, Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Brunswick County uses Code Red to provide alert warning information, website and social medial are used to provide information prior to and during disasters. Evacuation routes and emergency shelter locations are updated and posted. Bald Head Island: See update provided by the County. Belville: Belville will work with Brunswick County Emergency Management. Boiling Spring Lakes: Completed – part of day-to-day activities; use of Code Red; evacuation routes established; information posted on website and social media; grant awarded for digital message board at Fire Dept. to transmit messages, as well as updates from NWS

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								Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Deferred due to staffing constraints and funding. Leland Planning staff intends to pursue funding opportunities for stream and flood gauges that can be integrated into NC FIMAN. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. See update provided by the County. Sandy Creek: St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

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BC34	Continue and expand the program to retrofit schools and other public facilities to serve as emergency shelters.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Schools Brunswick Co Administration	General Funds, NCDPS	2026	Brunswick County: Brunswick County has established a shelter taskforce to identify shelter needs and evaluate shelter locations. The county shelter plan was updated August 2020. The updated plan modified shelter locations based on sheltering capabilities and resiliency of each shelter location. The taskforce continues to identified critical needs to improve shelter resiliency. Bald Head Island: See update provided by the County. Belville: Belville will work with Brunswick County Emergency Management and the Board of Education. Boiling Spring Lakes: City will continue to work with Brunswick County and NCEM. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: N/A for Leland. Emergency shelters are a county function. However, Leland is working to

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								establish a comfort station and backup EOC in a Town building. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC35	Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters at both the county and municipal level.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James,	Brunswick Co Emergency Services Municipal Administration	General Funds, N CDPS	2026	Brunswick County: Brunswick County conducts ongoing training to improve responder training. Training is based off of the current gaps or needs of each specific agency. Training is coordinated with Brunswick Community College, NCEM and private training institutions. Bald Head Island: See update provided by the County. Belville: Belville will use Duke Energy Education Pavilion to provide training. Boiling Spring Lakes: Completed – part of day-to-day activities

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				Sunset Beach, Varnamtown				Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. Holden Beach: See update provided by the County. Leland: Not clear on what training is referred to in this action item but Leland continuously trains first responders in a variety of aspects and skills. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County.

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								Varnamtown: See update provided by the County.
BC36	Work with industry to develop emergency response plans for specific industries and ensure that all plans are fully coordinated with County emergency management plans. These efforts will be carried out in conjunction with the County LEPC.	All	Moderate	Unincorporated Brunswick County	Brunswick Co LEPC, Brunswick Co Emergency Services	General Funds	2026	Brunswick County coordinates with industry partners to update and coordinate emergency plans. Industry partners participate in the County LEPC.
BC37	Evaluate areas with limited evacuation capacity and pursue methods of improving capacity. These efforts will be carried out with support from NCDOT and NCDPS.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Services Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Brunswick County continuously evaluates areas with limited evacuation capacity and works with supporting partners to identify methods of improving capacity. Emergency Services evaluates emergency access roads and evacuation points and provides recommendations for repairs, maintenance and improvements. Coordination with barrier islands and limited access islands is ongoing to develop plans and procedures. Bald Head Island: See update provided by the County. Belville: Current subdivision ordinance requires inter-parcel access. Boiling Spring Lakes: Deferred – continuously implementing - evacuation routes established; infrastructure repairs made; evaluation of areas with limited evacuation capacity being undertaken and methods for improvement to be pursued Bolivia: See update provided by the County.

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								Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Ongoing. Leland emergency services staff, Public Services staff, and Planning staff individually and collaboratively work to improve the street networks for more interconnectivity. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC38	Continue debris removal program to correct problem sites at both the County and municipal level.	All	High	Brunswick County, Bald Head Island, Belville,	Brunswick Co Emergency Services Brunswick Co	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County (consistent with current BC Solid Waste policies and plans).

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				Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Administration Municipal Administrations			As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Belville will be available to revise the debris management plan contained within the countywide hazard mitigation plan. The Town will identify items of concern during "hot wash" sessions after events. Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Leland has a debris management plan to deal with post-event debris. Leland also has contracted to perform "snag and drags" on 4 local creeks to remove debris and improve creek flow.

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								Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC39	Continue to maintain/enforce an overall cap of 5% on post-development stormwater discharge increase over pre-development conditions through the County's stormwater management program.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Engineering Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Belville will follow the County's lead and encourage compliance. Boiling Spring Lakes: Completed – require County stormwater permits for all commercial development and disturbance of 1 acre or more

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								Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: N/A for Leland Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC40	Continue to support efforts to place spoil materials from channel maintenance and dredging on Brunswick County beaches, including each of the incorporated municipalities, as warranted.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes,	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will

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				Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: The Town of Belville will need to dredge the Brunswick River for future developments. Boiling Spring Lakes: No update provided for this action Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: N/A for Leland Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC41	Support Section 206 Lower Lockwood Folly River Aquatic Habitat Restoration Project (removal of sediment bars to increase tidal flushing and improve aquatic habitat).	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration	General Funds, NCDEQ, NCDOT	2026	Brunswick County: Deferred BC and shoreline protection coalition partners will work with DEQ and USACE to seek funding to address Bald Head Island: See update provided by the County. Belville: Follow Brunswick County's recommendations Boiling Spring Lakes: See update provided by Brunswick County Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: N/A for Leland Navassa: See update provided by the County. Northwest: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC42	Continue implementation of EPA Phase II requirements. These efforts shall include providing oversight services to county municipalities.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Engineering Brunswick Co Administration Municipal Administrations	General Funds, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Continue to work with all environmental agencies to ensure compliance Boiling Spring Lakes: Completed – part of day-to-day activities Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Ongoing Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC43	Incorporate new FEMA digital FIRMs into the County GIS when necessary. This effort shall also include maintenance and inventory of all County land parcel data.	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest,	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	Completed	Brunswick County: Completed County has adopted most recent FIRM maps and made available on County GIS. Additionally, LOMC Mapping and Repetitive Loss Areas are also included in the GIS. Bald Head Island: See update provided by the County. Belville: Establish and communicate with the County to maintain the most accurate GIS/FIRM data at the local level

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Boiling Spring Lakes: Completed – 2018 FIRMs layer on GIS Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See County update Holden Beach: See update provided by the County. Leland: Leland is finalizing an online interactive flood risk map that incorporates this data and will be live by March 9, 2020. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BC44	Establish locations for flood awareness signs – show elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2 feet. Signs should be surveyed to serve as elevation reference marks.	Flood	Low	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Services Brunswick Co Administration Municipal Administrations	General Funds	2026	Brunswick County: Deferred Hurricane Floyd signs are in place; however, County would like to install Highwater signs for Hurricane Florence Bald Head Island: See update provided by the County. Belville: Work with HOA's and other community associations to gather and monitor this data Boiling Spring Lakes: Deferred (lack of staff, funding) Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Deferred. No progress made on this item from Leland. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC45	Continue to work closely with real estate agents to ensure that prospective buyers are educated about development within a flood hazard area. The County will prepare materials for dissemination to local real estate agents to assist in this education process. Additionally, materials and information regarding mitigation and retrofitting techniques will be made available on County and municipal websites.	Flood	High	Brunswick County, Bald Head Island, Calabash, Caswell Beach, Ocean Isle Beach, Sunset Beach	Brunswick Co Planning Brunswick Co Administration Municipal Administrations	General Funds, NCDPS, FEMA	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County with oversight from the Flood Plain Administrator. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: Bald Head Island includes real estate agents in Program for Public Information (PPI). Calabash: See update provided by the County. Caswell Beach: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sunset Beach: See update provided by the County.
BC46	Continue to expand upon the Alert Emergency Notification System available to all residents. Brunswick County Emergency Management will coordinate with all municipal jurisdictions regarding	All	High	Brunswick County, Bald Head Island, Belville,	Brunswick Co Administration Municipal Administration	General Funds, NCDPS	2026	Brunswick County: Brunswick County conducts outreach programs on Code Red to provide information and registration opportunities. Registration information is available

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	registration through the Brunswick County Emergency Notification Registration Portal.			Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				on the county website and social media. Outreach and registration conducted for the county access and functional needs population. Bald Head Island: Bald Head Island promotes Brunswick County's CodeRed emergency notification system in its PPI materials and promotes its own CodeRed registry. Belville: Future outreach - Ensure that all residents with special needs are identified Boiling Spring Lakes: Deferred – continuously implementing - Code Red notification system utilized; expansion efforts to ensure citizen registration to continue Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing; Leland coordinates with BC Emergency Services for this action item. Navassa: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC47	Establish and maintain retrofitting techniques and publicize in the public libraries, and also through citizen newsletters.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Services Brunswick Co Administration Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Deferred Need to review if Libraries has educational material to provide retrofitting techniques Bald Head Island: See update provided by the County. Belville: Conduct community workshops semi-annually Boiling Spring Lakes: Completed – information regarding retrofitting techniques available at City Hall and on the City website. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Deferred due to staff and time constraints. Will undertake in 2020 as part of CRS application. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC48	Coordinate with local churches and Spanish speaking representatives to disperse information about the hazards prevalent in the area and the steps they can take to mitigate these hazards.	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland,			2026	Brunswick County: Brunswick County coordinates through the Volunteer and Non-profit Coordinator established 9/2019 under county Emergency Services. Information is shared and coordinated through the county VOAD groups. Bald Head Island: See update provided by the County. Belville: Town will spearhead outreach efforts to churches and minority groups.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Boiling Spring Lakes: Ongoing- local church has agreed to maintain a library of educational information provided by City staff. Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Ongoing. Leland disseminates Spanish translated information about disaster preparedness and recovery. Additional efforts are pending as Leland becomes a CRS community. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC49	Maintain nuclear event preparedness. Develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and training necessary to maintain this preparedness. These efforts should be coordinated with the County LEPC to also include addressing man-made/ technological hazards.	Nuclear	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Services Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Brunswick County coordinates preparedness with the Brunswick Nuclear Taskforce and supporting partners. Plans developed to identify actions and responsibilities. Bald Head Island: See update provided by the County. Belville: Town will work with Brunswick County and incorporate plan for a nuclear event into the Emergency Operations Plan Boiling Spring Lakes: Completed – part of day-to-day activities – annual training and ongoing education through Duke Power Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								address the issue of nuclear event preparedness. Holden Beach: See update provided by the County. Leland: Completed. Leland follows Brunswick County's nuclear response plan in conjunction with Duke Energy and coordinated by the LEPC. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC50	Work closely with the Brunswick County Sheriff's Department on improving the County's multi-jurisdictional communications system in an effort to enhance interoperability.	All	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland,	Brunswick Co Sheriff's Office Municipal Administrations	General Funds, NCDPS	2026	Brunswick County: Brunswick County Emergency Services provides updates and coordination with EMS and Fire Departments to update plans and protocols for response. Coordinate implementation of new technology to improve response and data collection. Bald Head Island: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Belville: Provide a list of new homes, streets and developments to Brunswick County GIS and 911 Center Boiling Spring Lakes: Completed – part of day-to-day activities – new reporting system in place Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: See update provided by the County. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Varnamtown: See update provided by the County.
BC51	Monitor the status of backup generators, communications, and vehicles for all critical public facilities. In addition, develop a list of providers of emergency equipment.	Power-Outage	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown	Brunswick Co Emergency Services Municipal Administrations	General Funds, NCDPS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Items will be listed in the Emergency Operations Plan and a maintenance schedule will be attached. Boiling Spring Lakes: Completed – part of day-to-day activities – generator service company provides quarterly maintenance inspections; power supplies and cell phone modems installed on LAN; list of equipment maintained by BC Emergency Services; main Fire Dept. station generator tested weekly, fuel levels topped off and vehicles checked and maintained regularly Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Caswell Beach: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland currently has backup generators on all critical facilities and most Town buildings. Leland also maintains a list of providers of emergency equipment. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC52	Maintain fire event preparedness by ensuring fire hydrants are working properly and coordinating with the NC State Forest Service. These efforts will include the inspection of all fire hydrants. Additionally, County Emergency Services	Fire	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes,	Brunswick Co Emergency Services Municipal Fire Departments, NC Forest Service	General Funds, NCPDS, NCFS	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	will incorporate the improvement of firefighting procedures into these efforts.			Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Continue work in cooperation with H2GO and other agencies to ensure hydrants are painted, functioning and accessible (free from vegetation). Boiling Spring Lakes: Completed – part of day-to-day activities – fire hydrants flushed and tested annually; flow test completed every 4 years Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The Town Public Works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. Holden Beach: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Leland: Completed and ongoing. Leland performs routine inspections of fire hydrants and other suppression systems. Leland also maintains a Community Wildfire Protection Plan with NC Forestry Service. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County. Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC53	Continue to enforce and adopt water shortage response plans and water shortage ordinances for municipalities operating central water service.	Drought	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest,	Brunswick County Administration Municipal Administrations	General Funds, NCDEQ	Action deleted during 2021 plan update.	Brunswick County: This activity is part of the day-to- day operations of the County. As such, it is part of the County's mitigation capabilities and will be recorded in the Capability Assessment Section. This action will be removed from future plan updates. Bald Head Island: See update provided by the County. Belville: Update the Town's water shortage policy and include in the Emergency Operations Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Ocean Isle Beach, Sandy Creek, St. James, Sunset Beach, Varnamtown				Boiling Spring Lakes: No update provided for this action Bolivia: See update provided by the County. Calabash: See update provided by the County. Carolina Shores: See update provided by the County. Caswell Beach: This effort was completed in 2012 and will be implemented through future updates of this plan. The Town has not direct mailed notices to property owners regarding the Water Shortage Response Plan. Holden Beach: See update provided by the County. Leland: Completed and ongoing. Leland has an approved Water Shortage Response Plan overseen by the Public Services Department. Navassa: See update provided by the County. Northwest: See update provided by the County. Ocean Isle Beach: See update provided by the County. Sandy Creek: See update provided by the County. St. James: See update provided by the County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Sunset Beach: See update provided by the County. Varnamtown: See update provided by the County.
BC54	Identify areas where placement of flood monitoring gauges could be placed to improve flood warning capabilities of FIMAN.	Flooding	High	Brunswick County	Brunswick County Planning and Brunswick County Emergency Services	State and Federal Grants	2026	New action for the 2021 plan update.
BC55	Continue to work with Brunswick Nuclear Power Station to plan for any events which might require emergency action.	Fixed Nuclear Facilities	High	Brunswick County	Brunswick County Planning and Brunswick County Emergency Services	Staff time, State and Federal Grants	2026	New action for the 2021 plan update.
BC56	Work with appropriate stakeholders to identify areas where dam failure could occur and develop emergency action plans for those dams, as needed.	Dam Failure	High	Brunswick County	Brunswick County Planning and Brunswick County Emergency Services	Staff time, State and Federal Grants	2026	New action for the 2021 plan update.

Bald Head Island Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BHI1	Continue to support the Bald Head Island Conservancy and the Smith Island Land Trust in their efforts to acquire land for open space preservation. It is the Village's desire that these properties be deed restricted and maintained in their natural state.	All	High	Bald Head Island Administration	General Funds, SILT	2026	In addition to making property owners aware of the Smith Island Land Trust (SILT) and its mission, BHI assists SILT to ensure that conservation properties are maintained and managed to protect water quality, wildlife habitat, and provide natural open spaces on BHI. We assist to identify potential preservation violations before they occur and notify the SILT immediately, so problems are mitigated.
BHI2	Continue to maintain a local early warning system relating to notifications regarding flooding and other man-made disasters. This effort should involve all citizens and visitors, as well as the Village's critical infrastructure system.	All	High	Bald Head Island Emergency Services Brunswick County Emergency Services	General Funds, NCDPS	2026	Bald Head Island has its own CodeRed emergency notification registry, an e-newsletter blast, social media channels (Facebook, Twitter, Instagram, YouTube), and will be launching a PEG channel with scrolling capability on Spectrum in the near future. Outreach to rental agencies to promote these channels to our visitors is planned.

Boiling Spring Lakes Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
BSL1	Consider offering incentives for the use of permeable driveways and surfaces to reduce runoff and promote groundwater recharge.	Drought	Moderate	Municipal Administration	N/A	2021	New Action for 2021 Plan
BSL2	Develop preparedness plan for tornadoes and earthquakes that addresses immediate search and rescue efforts and enhances public awareness and education.	Tornado/Earthquake	Moderate	Municipal Administration	General Funds	2021	New Action for 2021 Plan
BSL3	Acquire sites and/or obtain agreements with local churches and businesses to serve as safe sites within the City	All	Moderate	Municipal Administration	General Funds, NCDPS	2026	New Action for 2021 Plan
BSL4	Ensure the new police department is hazard resistant.	All	High	Municipal Administration	General Funds, NCDPS	2026	New Action for 2021 Plan
BSL5	Acquire property to integrate into Charles Schneider Park and North Lake Park	Flooding	Moderate	Municipal Administration	General Funds, NCDEQ	2026	New Action for 2021 Plan
BSL6	Consider possible secondary evacuation route for Section 21 and Section 11	Flooding	Moderate	Municipal Administration	General Funds, NCDPS	2026	New Action for 2021 Plan
BSL7	Placement of information stations throughout the City to provide residents with access to critical information in the event such access via media outlet is inaccessible.	All	Moderate	Municipal Administration	General Funds	2026	New Action for 2021 Plan
BSL8	Incorporate flood protection and drainage system maintenance information into website	Flooding	Moderate	Municipal Administration	General Funds	2026	New Action for 2021 Plan
BSL9	Use GIS to map hazard areas and at-risk structures	All	Moderate	Municipal Administration	General Funds	2026	New Action for 2021 Plan
BSL10	Establish, adopt and enforce minimum housing code for the improvement of substandard housing.	All	Moderate	Municipal Administration	General Funds	2026	New Action for 2021 Plan

Holden Beach Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
HB1	Continue to monitor and improve the town- wide water system. This effort will include: increase water pressure on west end of island by improving water availability, upsizing, or installing new lines; Relocate all critical elements of the Town's wastewater system above base flood elevation, including all pump stations and control mechanisms.	Flood	Moderate	Holden Beach Administration	General Funds, NCDEQ, HMGP	Lift station 4 complete/ construction has started on lift station three and design work has begun on 1&2. Town wide water system has had an engineering update waterflow has been recorded on west end and Water system has been added to the long-term capital improvement plan	Lift station 4 complete/ construction has started on lift station three and design work has begun on 1&2. Town wide water system has had an engineering update waterflow has been recorded on west end and Water system has been added to the long-term capital improvement plan

Northwest Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NW1	Construct storm drainage piping and ditch improvements as follows: 3,300 LF of ditch improvements; 1,200 LF of new ditch; 2,250 LF of ditch improvements; 1,200 LF of new ditch; 435 LF of ditch improvements; 2,100 LF of new ditch; 300 LF of ditch improvements; 5,195 of new ditch; 1,492 LF of new ditch; 1,900 LF of new ditch and piping; Installation of 50 LF of RCP pipe	Flood	High	Northwest Administration	General Funds, NCDEQ	2026	Update pending

Oak Island Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
OKI-1	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also outline sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated on these issues to work with prospective builders.	Flood	High	Oak Island Development Services, Oak Island Emergency Services, Oak Island Administrations	General Funds	Completed: A Library of materials that focuses on educating citizens, builders, realtors and developers about the dangers associated with floodplain development has been created.	To monitor and continuously update and maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development.
OKI-2	When possible, ensure that no public and/or critical facilities are proposed for flood hazard areas. Additionally, when siting new public/critical facilities, the information and data outlined in this plan will be factored into the decision-making process.	Flood	High	Oak Island Development Services, Oak Island Emergency Services, Oak Island Administrations	General Funds	Ongoing: Development Services reviews all proposed location for public and /or critical facilities to assure placement are outside of flood hazard areas or are engineered to minimize flood damage.	Continue to review and prevent the placement of public and\or critical facilities within flood hazard areas and to use the information and data outlined in this plan into the decision-making process.
OKI-3	In conjunction with annual EOP updates, determine if access to all critical facilities is readily available in the event of a natural hazard event. Careful consideration should be given to localized flooding issues that may restrict access along limited access thoroughfares. Where access issues are identified, establish a plan for alternative transportation.	All	High	Oak Island Development Services, Oak Island Emergency Services, Oak Island Administrations	General Funds	Ongoing: Oak Island has created a map of all its critical facilities and is reviewing temporary locations to move during a natural hazard event if needed.	Continually update flood prone area map and look at alternative transportation and temporary relocation of critical facilities in the event of a natural hazard event.
OKI-4	Maintain Town Stormwater Ordinances in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements. These efforts should also include analysis of stormwater hotspots and potential remedies for these issues.	Flood	High	Oak Island Development Services, Oak Island Public Works, Oak Island Administrations	General Funds, NCDEQ	Ongoing: Oak Island continually maintains and updates it Stormwater Ordinance. Oak Island has identified and mapped low	To complete repairs to Oak Island's existing stormwater system and to continue to look at alternative stormwater designs that are compatible with Oak Island's Phase II NPDES permit.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
						lying areas prone to flooding. Public Works has prioritized stormwater maintenance in these areas and repairs to existing stormwater system.	
OKI-5	Review respective Comprehensive Land Use Plans annually to ensure that the Future Land Use Maps adequately delineates portions of Oak Island deemed unsuitable for development due to existing environmental conditions or other factors outlined in this plan.	All	Moderate	Oak Island Development Services, Oak Island Administration	General Funds, NCDPS, NCDEQ	Ongoing: Oak Island reviews it Comprehensive Land Use Plan on an annual basis and has implemented new development standards.	To continue to review Oak Islands Comprehensive Land Use Plan on an annual basis and to update as needed.
OKI-6	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events.	Flood	High	Oak Island Development Services, Oak Island Administration	General Funds, NCDPS	Ongoing: Oak Island adopted the most current State model Flood Damage Prevention ordinance in October 2017, updated in April of 2018 and reviews on an annual basis.	To continue annual reviews of the Flood Damage Prevention Ordinance and update as necessary.
OKI-7	Work closely with NCDOT and the Cape Fear Regional MPO to improve road access standards and protect the integrity of significant traffic-carrying roadways throughout the County. These efforts should specifically target the issue of restriping highway intersections and lane markings for higher visibility.	All	Moderate	Brunswick Co Administration, Oak Island Development Services, Oak Island Public Works, Oak Island Administrations, NC Department of Transportation Cape Fear Regional MPO	General Funds, NCDOT	Ongoing: Oak Island continuously works with NCDOT and attends the Cape Fear Regional MPO meetings to improve road access standards and improvements to the highway system.	To maintain Oak Island's communication with NCDOT and participation with the Cape Fear Regional MPO to work towards improving road access standards and protect the integrity of significant traffic-carrying roadways throughout the County.
OKI-8	Continue to undertake the following actions to support maintenance of safe hurricane evacuation routes: Identify and support improvements to roads that serve as hurricane evacuation routes, post evacuation routes on County and	Hurricane	High	Brunswick Co Emergency Operations Center, Oak Island Emergency Services, Oak Island Administrations	General Funds, NCDPS	Oak Island continues to evaluate hurricane evacuation routes off the island throughout the county. Currently	Oak Island will continue to work with the County on updating evacuation routes and procedures for access after a severe hazard event.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	Town websites, perform routine bridge and culvert maintenance, and raise bridges over streams that have documented flooding during significant rain events, support the planning and implementation of regional roadways					reviewing procedures for property owners and residents access onto the island after a severe hazard event.	
OKI-9	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLPs) from future flood events. Oak Island will maintain a list of RLPs and, on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The County will assist all municipal jurisdictions in working through the structural mitigation grant funding process.	Flood	High	Oak Island Development Services, Oak Island Administration Brunswick Co Administration	General Funds, NCDPS	Oak Island Maintains a RLP list and reviews it annually for grants through NCEM and FEMA for mitigation of RLP from future flood events.	Oak Island will continue to maintain a RLP list and review on an annually basis for grants through the NCEM and FEMA for mitigation of RLP from future flood events.
OKI-10	Integrate publicly acquired land into public park and greenway systems. These efforts may be carried out through update of the County Blue/Greenway system, as well as municipal planning efforts.	All	Moderate	Oak Island Development Services, Oak Island Administration Brunswick Co Administration	General Funds, NCDEQ, NCDOT	Ongoing: Coordinating with Brunswick County on possible connection points and review of applicable jurisdictional plans.	Continue to identify public lands that are suitable for greenway repurposing and blueway zones.
OKI-11	Continue to enforce the NC State Building Code. Oak Island inspections staff will recertify the NC State Building Code as the adopted local regulation applying to all construction activities on an annual basis. Through enforcement of the NC State Building Code, Oak Island will work to ensure that all structures, including manufactured homes, are properly anchored to minimize potential impacts stemming from a disaster event.	Flood, Hurricane	High	Oak Island Development Services	General Funds	Ongoing: Oak Island has adopted, maintains and enforces the current NC State Building Codes. Oak Island performs required inspections to ensure that all structures, including manufactured homes, are properly anchored to minimize potential impacts stemming	Continue enforcement of the current NC State Building Codes and required inspection to ensure that all structures, including manufactured homes, are properly anchored to minimize potential impacts stemming from a disaster event.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
						from a disaster event.	
OKI-12	Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of flood-prone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials).	All	High	Brunswick Co Emergency Operations Center, Oak Island Emergency Services, Oak Island Administrations	General Funds, NCDPS	Ongoing: Oak Island has updated its EOP/Hurricane Preparedness, Evacuation and Recovery Plan. The Plan details warning protocol, evacuation procedures, reentry procedures and after reentry.	Oak Island will continue to review and update its EOP/Hurricane Preparedness, Evacuation and Recovery Plan on an annual basis.
OKI-13	Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters at both the county and municipal level.	All	High	Oak Island Emergency Services, Oak Island Administrations	General Funds, NCDPS	Ongoing: Oak Island, at minimum provides an annual event exercise where an After Action Report is prepared that identifies opportunities to help mitigate the effects of future disasters.	Oak Island will continue to perform annual event exercises and prepare After Action Reports that will help identify opportunities to mitigate the effects of future disasters.
OKI-14	Continue to work closely with real estate agents to ensure that prospective buyers are educated about development within a flood hazard area. Oak Island will prepare materials for dissemination to local real estate agents to assist in this education process. Additionally, materials and information regarding mitigation and retrofitting techniques will be made available on Oak Island's websites.	Flood	High	Oak Island Development Services, Oak Island Administration	General Funds, NCDPS, FEMA	Ongoing: Oak Island conducts annual workshops for real estate agents and contractors to educate them on development within a flood hazard area.	Continue providing annual workshops for real estate agents and contractors to educate them on development within a flood hazard area
NEW OKI-15	Oak Island will develop a Terrorism Risk Management Program. The program will identify potential threats, perform site assessments to determine personal and facilities vulnerability and how to protect the facility and its occupants.	Terrorism	Moderate	Oak Island Emergency Services, Oak Island Administrations	General Funds, NCDPS	2025	New action for the 2021 update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NEW OKI-16	Oak Island will develop Cyber Attack Management Program. The program will require periodic review of Oak Island's computer network security and provide a mitigation plan to prevent any type of a cyber-attack.	CYBER	High	Oak Island Administrations, Oak Island IT Department	General Funds, NCDPS	2025	New action for the 2021 update.
NEW OKI-17	Oak Island will develop an Infectious Disease Risk Management Program. The program will identify ways to manage the spread of disease and to contain an outbreak. The plan will contain information on coordination with other city, county, regional, state and federal agencies and other organizations responding to a larger public health emergency; perform site assessments to determine personal and facilities vulnerability and how to protect the facility and its occupants.	Infectious Disease	High	Oak Island Emergency Services, Oak Island Administration	General Funds, NCDPS, FEMA	2025	New action for the 2021 update.

Ocean Isle Beach Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
OIB1	Inspect all fire hydrants within the Town's corporate limits on a revolving schedule. Through this effort, the Town will aim to inspect each hydrant a minimum of two times per calendar year.	Fire	High	Sunset Beach Fire Department Brunswick County Emergency Services	General Funds, NCDPS	Deleted as part of the 2021 update	This is an ongoing maintenance activity for the Town and will be removed from future plan updates.
OIB2	Continue to maintain National Weather Service StormReady and TsunamiReady designations.	Hurricane	Moderate	Ocean Isle Beach Administration Brunswick County Emergency Services	General Funds, NCDPS, NWS	Deleted as part of the 2021 update	This is an ongoing capability for the Town and will be removed from future plan updates.
OIB3	Improve overall safety measures regarding ingress and egress from town. Initially, the town will achieve this strategy by installing five cameras at designated locations.	All	Moderate	Ocean Isle Beach Administration Brunswick County Emergency Services	General Funds, NCDPS	2026	This action will be revisited during the 2026 updates of the plan.

Shallotte Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SH1	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also outline sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated on these issues to work with prospective builders.	Flood	High	Shallotte	Shallotte Planning	General Funds	Ongoing	Continuing
SH2	Continue/expand efforts to partners with area utility districts to encourage proper development of regional water and sewer systems.	Flood	High	Shallotte	Shallotte Utilities	General Funds, NCDPS, NCDEQ	Ongoing	The Town has an open-end contract to purchase water from Brunswick County utilities. The town also adds or increases line size in order to supply adequate flow and supply as needed
SH3	When possible, ensure that no public and/or critical facilities are proposed for flood hazard areas. Additionally, when siting new public/critical facilities, the information and data outlined in this plan will be factored into the decision-making process.	Flood	High	Shallotte	Shallotte Administration	General Funds	Ongoing	The Town will review the Flood Risk Information System prior to placing critical facilities
SH4	In coordination with participating municipal jurisdictions, continue to accept gifts/donations of land located in hazard areas or rendered unbuildable by storms or other events, for the purpose of shorefront access.	Flood, Erosion	Moderate	Shallotte	Shallotte Administration	General Funds, NCDPS	Ongoing	The Town would evaluate any proposed donation of property along the Shallotte River for the purpose of river access
SH5	In conjunction with annual EOP updates, determine if access to all critical facilities is readily available in the event of a natural hazard event. Careful consideration should be given to localized flooding issues that may restrict access along limited access thoroughfares. Where access issues are identified,	All	High	Shallotte	Shallotte Administration	General Funds	Ongoing	The Town will review the Flood Risk Information System prior to placing critical facilities

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	establish a plan for alternative transportation.							
SH6	Maintain County and Town Stormwater Ordinances in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements. These efforts should also include analysis of stormwater hotspots and potential remedies for these issues.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDEQ	Ongoing	The Town has an adopted stormwater ordinance which is periodically reviewed with the Town's engineering service
SH7	Consider submitting an application to join the Community Rating System using Hazard Mitigation components to fulfill application requirements.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS	Completed	The Town considered applying to the CRS during the 2018 update to the Town's flood rick ordinances and maps. Given current staffing and the number of insured properties it was deemed infeasible. The Town will re-evaluate with future updates to flood regulations.
SH8	Review respective Comprehensive Land Use Plans annually to ensure that the Future Land Use Maps adequately delineates portions of the County/ municipalities deemed unsuitable for development due to existing environmental conditions or other factors outlined in this plan.	All	Moderate	Shallotte	Shallotte Planning	General Funds, NCDPS, NCDEQ	Completed	In 2018 the Town completed an update to Shallotte Comprehensive Land Use Plan, to include an updated FLU map. This plan will be considered for periodic updates and revisions.
SH9	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events. Additionally, jurisdictions with freeboard requirements adopted at the local level will continue to enforce these minimum standards (Brunswick County freeboard requirements is two feet above BFE).	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS	Completed	In 2018 the Town completed an update its flood risk ordinances and maps. The Town currently requires a two (2) foot freeboard.
SH10	Periodically evaluate local land development regulations for ability to target and direct growth to areas	Flood	Moderate	Shallotte	Shallotte Planning & Utilities	General Funds	Ongoing	The Town continually evaluates both its land use

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	consistent with the land classification map, the water distribution system, and existing and future sewer systems.							regulations and maps for appropriate growth.
SH11	Work closely with NCDOT and the Grand Strand Area Transportation Study ~~Cape Fear Regional~~ MPO to improve road access standards and protect the integrity of significant traffic-carrying roadways throughout the Town ~~County~~. These efforts should specifically target the issue of restriping highway intersections and lane markings for higher visibility.	All	Moderate	Shallotte	Shallotte Administration	General Funds, NCDOT	Ongoing	The Town continues to work with both NCDOT and the GSATS MPO to improve road access standards and protect the integrity of significant traffic-carrying roadways throughout the Town
SH12	Continue to consider incorporating the concept of cluster subdivision development into the County's subdivision regulations. Employing this development option, if adopted, will provide for a development pattern which minimizes impacts on environmentally sensitive portions of the County, including floodplains.	All	Moderate	Shallotte	Shallotte Planning	General Funds, NCDEQ	Completed	The Town currently has regulations in place allowing residential cluster development
SH13	Review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS, FEMA	Ongoing	The Town will continue to review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses
SH14	Maintain all FEMA Elevation Certificates, FEMA Floodproofing Certificates for non-residential structures, and where applicable, a V Zone Design Certificate for all structures built or floodproofed since application to the CRS. V Zone Design Certification must be maintained only for structures built subsequent to January 1, 2013.	Flood	High	Shallotte	Shallotte Planning	General Funds	Completed	In 2018 the Town contracted with Brunswick County Code Administration for the administration of, to include record keeping, Town's floodplain requirements.
SH15	Review written policies on water and sewer system extensions and tap on	Flood	High	Shallotte,	Shallotte Utilities	General Funds,	Ongoing	The Town will review written policies on water and sewer extensions and taps on

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	policies to ensure that the County is adequately addressing and discouraging inappropriate development in sensitive environmental areas and areas prone to flood or storm surge hazards.					Sewer Districts		policies to address and discourage development in sensitive environmental areas and areas prone to flood or storm surge hazards.
SH16	Consider the data and recommendations outlined in this plan when preparing updates to Capital Improvements Plans. All recommendations regarding capital expenditures will focus on siting all infrastructure and public facilities outside of the Flood Hazard Area.	All	Moderate	Shallotte	Shallotte Administration	General Funds	Ongoing	The Town will continue to consider data and recommendations outlined in this plan when preparing updates to Capital Improvements Plans. All recommendations regarding capital expenditures will focus on siting all infrastructure and public facilities outside of the Flood Hazard Area.
SH17	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development. These efforts will be incorporated into the comprehensive planning process.	Flood	Low	Shallotte	Shallotte Planning	General Funds, NCDPS, NCDEQ	Ongoing	The Town will Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development.
SH18	Support commercial forestry activities, provided significant adverse impacts on natural resource systems are fully mitigated. Such activities should be considered in accordance with the standards and recommendations of the US Forest Service. ~~The County also advocates the voluntary participation of commercial forestry interests in the State of North Carolina's best management practice program for forestry management.~~	All	High	Shallotte	Shallotte Planning	General Funds, NCFS	Ongoing	The Town has implemented a tree protection ordinance and will continue to advocate for the preservation of natural vegetation and wherever possible to preservation of heritage trees.
SH19	Continue to support beach municipalities in maintenance/protection of beaches as well as protecting shorelines under County jurisdiction.	Erosion	High	Shallotte	Shallotte Administration	~~General Funds,~~ USACE	Ongoing	The Town will, when possible, support beach municipalities in maintenance/protection of beaches as well as protecting

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								shorelines under County jurisdiction.
SH20	Continue to require 404 wetlands and 100-year floodplain areas to be delineated on all preliminary subdivision plats for lands within ~~and adjacent to~~ the proposed subdivision.	Flood	Moderate	Shallotte	Shallotte Planning	General Funds, NCDPS, NCDEQ	Ongoing	The Town will continue to require 404 wetlands and 100-year floodplain areas to be delineated on all preliminary subdivision plats for lands ~~within and adjacent to~~ the proposed subdivision.
SH21	Continue to undertake the following actions to support maintenance of safe hurricane evacuation routes: Identify and support improvements to roads that serve as hurricane evacuation routes, post evacuation routes on ~~County and~~ Town websites, ~~perform routine bridge and culvert maintenance~~, and work with NCDOT to raise bridges over streams that have documented flooding during significant rain events, support the planning and implementation of regional roadways	Hurricane	High	Shallotte	Shallotte Administration	General Funds, NCDPS	Ongoing	Continue to undertake actions to support maintenance of safe hurricane evacuation routes: Identify and support improvements to roads that serve as hurricane evacuation routes, post evacuation routes on County and Town websites, perform routine bridge and culvert maintenance, and work with NCDOT to raise bridges over streams that have documented flooding during significant rain events, support the planning and implementation of regional roadways
SH22	Continue to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of freshwater swamps, marshes, and 404 wetlands.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDEQ	Ongoing	Continue to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of freshwater swamps, marshes, and 404 wetlands.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
~~SH23~~	Support the relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations. Additionally, the issue of tax base loss should be taken into account within municipal jurisdictions.	~~Landslide~~	High	~~Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Oak Island, Ocean Isle Beach, Sandy Creek, Shallotte, Southport, St. James, Sunset Beach, Varnamtown~~	~~Brunswick Co Planning NCDPS~~	~~General Funds, NCDPS~~		Remove-Shallotte has very little areas affected by shoreline erosion
SH24	Continue to enforce respective flood damage prevention ordinances and participate in the National Flood Insurance Program. Subdivision regulations will be enforced – requiring elevation monuments to be set so that floodplain elevations can be more easily determined. Additionally, municipalities with freeboard requirements shall continue to enforce this standard locally.	Flood	High	Shallotte	Shallotte Planning	General Funds	Ongoing	The Town has updated its flood damage prevention ordinance and maps. The Town has contracted with Brunswick County Code Administration for the review and enforcement of flood prevention plans and permits. The Town will continue to see that these standards are enforced.
SH25	Continue to support the guidelines of the Coastal Area Management Act and the efforts and programs of the NC Department of Environmental Quality, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of Brunswick County.	All	Moderate	Shallotte	Shallotte Administration & Planning	General Funds, NCDEQ		The Town will continue to support the guidelines of the Coastal Area Management Act and the efforts and programs of the NC Department of Environmental Quality, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of the Town.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SH26	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLPs) from future flood events. The County will maintain a list of RLPs and, on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The County will assist all municipal jurisdictions in working through the structural mitigation grant funding process.	Flood	High	Shallotte	Shallotte Administration and Planning	General Funds, NCDPS	Ongoing	The Town will continue to to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLPs) from future flood events. The County will maintain a list of RLPs and, on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The County will assist all municipal jurisdictions in working through the structural mitigation grant funding process.
SH27	Integrate publicly acquired land into public park and greenway systems. These efforts may be carried out through update of the County Blue/Greenway system, as well as municipal planning efforts.	All	Moderate	Shallotte	Shallotte Administration	General Funds, NCDEQ, NCDOT	Ongoing	The Town continues to seek the integration of public land into municipal park and greenway systems. These efforts may be carried out through update of the County Blue/Greenway system, as well as municipal planning efforts.
SH28	Continue to enforce the NC State Building Code. Local government inspections staff will recertify the NC State Building Code as the adopted local regulation applying to all construction activities on an annual basis. Through enforcement of the NC State Building Code, jurisdictions will work to ensure that all structures, including manufactured homes, are properly anchored to minimize potential impacts stemming from a disaster event.	Flood, Landslide	High	Shallotte	Shallotte Administration	General Funds	Ongoing	The Town contracts with Brunswick County Code Administration for the enforcement of State Building Code.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SH29	Consider a policy for contractors to pick up building material and building debris prior to coastal storms.		High	Shallotte	Shallotte Planning	General Funds, FEMA	Ongoing	The Town will consider a policy for contractors to pick up building material and building debris prior to coastal storms.
SH30	Continue to enforce minimum housing code to require the improvement of substandard housing.	All	Moderate	Shallotte	Shallotte Administration	General Funds		The Town may look into contracting with Brunswick County Code Administration for the adoption and enforcement of a minimum housing ordinance.
SH31	Continue providing density credits for developments that establish perpetual easements for ecologically sensitive lands.	All	Low	Shallotte	Shallotte Administration and Planning	General Funds	Ongoing	The Town will explore providing density credits for developments that establish perpetual easements for ecologically sensitive lands.
SH32	Enhance and develop new public accesses to waterway resources in a manner as to protect sensitive environment areas from development and implement the priority recommendations contained in the Brunswick County Shoreline Access Plan.	All	Moderate	Shallotte	Shallotte Administration	General Funds, NCDPS	Ongoing	The Town has begun work on the Shallotte Riverwalk which will provide pedestrian and kayak access to the Shallotte River.
SH33	Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of flood-prone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials).	All	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services and the Brunswick County Sheriff's Office in the preparedness and response strategies.
SH34	~~Continue and expand the program to retrofit schools and other public facilities to serve as emergency shelters.~~	All	Moderate	Shallotte	Brunswick Co Schools Brunswick Co Administration	General Funds, NCDPS		Remove
SH35	Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters at both the county and municipal level.	All	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services and

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								the Brunswick County Sheriff's Office in the preparedness and response strategies. Annually, the Fire/Rescue Department revisits the Hazard Risk Assessment to evaluate potential risks and further enhance planning and response measures.
SH36	Work with industry to develop emergency response plans for specific industries and ensure that all plans are fully coordinated with County emergency management plans. These efforts will be carried out in conjunction with the County LEPC.	All	Moderate	Unincorporated Brunswick County	Shallotte Fire/Rescue Department	General Funds	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services and Brunswick County Code Enforcement/Inspections Department in the preparedness and response strategies. Annually, the Fire/Rescue Department revisits the Hazard Risk Assessment to evaluate potential risks and includes specific industries in enhancing response measures.
SH37	Evaluate areas with limited evacuation capacity and pursue methods of improving capacity. These efforts will be carried out with support from NCDOT and NCDPS.	All	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services, the Town of Shallotte Police Department and Brunswick County Code Enforcement/Inspections Department in the evacuation strategies.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SH38	Continue debris removal program to correct problem sites at ~~both~~ the ~~County and~~ municipal level.	All	High	Shallotte	Shallotte Public Administration and Works	General Funds, NCDPS	Ongoing	The Town will continue to evaluate potential debris removal program to correct problem sites at both the County and municipal level.
SH39	Continue to maintain/enforce an overall cap of 5% on post-development stormwater discharge increase over pre-development conditions through the Town's ~~County's~~ stormwater management program.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS	Ongoing	The Town will continue to maintain/enforce an overall cap of 5% on post-development stormwater discharge increase over pre-development conditions through the Town's County's stormwater management program.
SH40	~~Continue to support efforts to place spoil materials from channel maintenance and dredging on Brunswick County beaches, including each of the incorporated municipalities, as warranted.~~	All	Moderate	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Oak Island, Ocean Isle Beach, Sandy Creek, Shallotte, Southport, St. James, Sunset Beach, Varnamtown	Brunswick Co Administration Municipal Administrations	General Funds, NCDPS		Remove
SH41	~~Support Section 206 Lower Lockwood Folly River Aquatic Habitat Restoration Project (removal of sediment bars to increase tidal flushing and improve aquatic habitat).~~	Flood	High	Brunswick County, Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Oak Island, Ocean Isle Beach,	Brunswick Co Administration	General Funds, NCDEQ, NCDOT		Remove

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				Sandy Creek, Shallotte, Southport, St. James, Sunset Beach, Varnamtown				
SH42	Continue implementation of EPA Phase II requirements. These efforts shall include providing oversight services to county municipalities.	All	High	Shallotte	Shallotte Planning	General Funds, NCDEQ	Ongoing	The Town will continue implementation of EPA Phase II requirements. These efforts shall include providing oversight services to county municipalities
SH43	Incorporate new FEMA digital FIRMs into the County GIS when necessary. This effort shall also include maintenance and inventory of all County land parcel data.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS		The Town uses the County GIS layers within the municipal geodatabase.
SH44	Establish locations for flood awareness signs – show elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2 feet. Signs should be surveyed to serve as elevation reference marks.	Flood	Low	Shallotte	Shallotte Planning	General Funds	Ongoing	The town will establish locations for flood awareness signs – show elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2 feet. Signs should be surveyed to serve as elevation reference marks.
SH45	Continue to work closely with real estate agents to ensure that prospective buyers are educated about development within a flood hazard area. The County will prepare materials for dissemination to local real estate agents to assist in this education process. Additionally, materials and information regarding mitigation and retrofitting techniques will be made available on County and municipal websites.	Flood	High	Shallotte	Shallotte Planning	General Funds, NCDPS, FEMA	Ongoing	The Town will continue to work closely with real estate agents to ensure that prospective buyers are educated about development within a flood hazard area. The County will prepare materials for dissemination to local real estate agents to assist in this education process. Additionally, materials and information regarding mitigation and retrofitting techniques will be made

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								available on County and municipal websites.
SH46	Continue to expand upon the Alert Emergency Notification System available to all residents. Brunswick County Emergency Management will coordinate with all municipal jurisdictions regarding registration through the Brunswick County Emergency Notification Registration Portal.	All	High	Shallotte	Shallotte Administration and Fire Dept	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services to gather and disseminate pertinent information to the public. This information is being delivered via social media, Code Red and Reverse 911.
SH47	Establish and maintain retrofitting techniques and publicize in the public libraries, and also through citizen newsletters.	All	High	Shallotte	Shallotte Planning	General Funds, NCDPS	Ongoing	The Town contracts with Brunswick County Code Administration to maintain retrofitting techniques and publicize in the public libraries.
SH48	Coordinate with local churches and Spanish speaking representatives to disperse information about the hazards prevalent in the area and the steps they can take to mitigate these hazards.	All	Moderate	Shallotte	Shallotte Administration		Ongoing	The Town will coordinate with local churches and Spanish speaking representatives to disperse information about the hazards prevalent in the area and the steps they can take to mitigate these hazards.
SH49	Maintain nuclear event preparedness. Develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and training necessary to maintain this preparedness. These efforts should be coordinated with the County LEPC to also include addressing man-made/ technological hazards.	Nuclear	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services in the planning and response strategies relating to the nuclear power plant. The Fire/Rescue Department regularly participates in regional decontamination and

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								response drills at area key points of interest. Additionally, the Fire/Rescue Department works closely with Sunny Point Military Ocean Terminal in the preparedness and response to Hazardous Materials and High-Hazards marine vessel incident response.
SH50	Work closely with the Brunswick County Sheriff's Department on improving the County's multi-jurisdictional communications system in an effort to enhance interoperability.	All	High	Shallotte	Shallotte PD	General Funds, NCDPS	Ongoing	The Shallotte Police Department will continue to work with the Brunswick County Sheriff Department along with other law enforcement partners to improve the multi-jurisdiction communications system for enhanced interoperability.
SH51	Monitor the status of backup generators, communications, and vehicles for all critical public facilities. In addition, develop a list of providers of emergency equipment.	Power-Outage	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCDPS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Emergency Services and Brunswick County Code Enforcement/Inspections Department in the preparedness and response strategies. Annually, the Fire/Rescue Department revisits the Hazard Risk Assessment to evaluate potential risks and includes specific infrastructure items.

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								Working closely with Brunswick County Emergency Services, a list of equipment providers is compiled and maintained.
SH52	Maintain fire event preparedness by ensuring fire hydrants are working properly and coordinating with the NC State Forest Service. These efforts will include the inspection of all fire hydrants. Additionally, County Emergency Services will incorporate the improvement of firefighting procedures into these efforts.	Fire	High	Shallotte	Shallotte Fire/Rescue Department	General Funds, NCPDS, NCFS	Ongoing	The Fire/Rescue Department continues to work closely with Brunswick County Public Utilities, the Town of Shallotte Public Utilities Department and Brunswick County Code Enforcement/Inspections Department in the location and maintenance of fire hydrants. Annually, each fire hydrant is maintained, in good repair and ensured to be operable and have an acceptable rate of flow. The Fire/Rescue Department revisits the Hazard Risk Assessment to evaluate potential risks with regards to Wildland Urban interface and works closely with Brunswick County Emergency Services and NC Forest Services to enhance response measures.
SH53	Continue to enforce and adopt water shortage response plans and water shortage ordinances for municipalities operating central water service.	Drought	High	Shallotte	Shallotte Utilities	General Funds, NCDEQ	Ongoing	The Town will continue to enforce, update and adopt water shortage plans and water shortage ordinances in order to operate our central water services

Southport Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SP1	Continue to maintain a library of materials focused on educating citizens, builders, realtors and developers about the dangers associated with floodplain development. This information will also outline sound techniques for floodplain development and floodproofing of existing structures. The County will also maintain staff educated on these issues to work with prospective builders.	Flood	High	Southport	Brunswick Co Planning, Brunswick Co Emergency Services Southport Administration	General Funds	Ongoing	The City's Planning & Inspections Department continues to maintain a library of materials to educate community stakeholders with floodplain development. The City of Southport has hardcopies at its office as well as digital resources on its website. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The City also now has a CFM on staff that has received further training in order to offer greater assistance to citizens.
SP2	Continue/expand efforts to partners with area utility districts to encourage proper development of regional water and sewer systems.	Flood	High	Southport	Brunswick Co Administration Brunswick Co Sewer Districts, Southport Administration	General Funds, NCDPS, NCDEQ	Ongoing	The City of Southport is currently working with Brunswick County to expand one of the County's Wastewater Plants by 750,000 gpd capacity rather

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								than build its own plant to serve its Wastewater customers. The City's elected officials thought a regional approach would be a better way moving forward.
SP3	When possible, ensure that no public and/or critical facilities are proposed for flood hazard areas. Additionally, when siting new public/critical facilities, the information and data outlined in this plan will be factored into the decision-making process.	Flood	High	Southport	Brunswick Co Administration Southport Administration	General Funds	Ongoing	The City continues to ensure that critical public facilities are not proposed for flood hazard areas. At one point the City was looking at an option to build a treatment plant on City Property near a SFHA zone. After considering the location among other factors, the City decided to take a regional approach for wastewater treatment with Brunswick County.
SP4	In coordination with participating municipal jurisdictions, continue to accept gifts/donations of land located in hazard areas or rendered unbuildable by storms or other events, for the purpose of shorefront access.	Flood, Erosion	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City has accepted a land donation area in a SFHA for a future park. The City received property alongside Bonnets Creek that is in an AE Zone. The City continues to be interested in accepting future land donations in hazard areas and will do so if any opportunities become available.
SP5	In conjunction with annual EOP updates, determine if access to all critical facilities is readily available in the event of a natural hazard event. Careful consideration should be given to localized flooding issues that may restrict access	All	High	Southport	Brunswick Co Emergency Operations Center, Southport Administration	General Funds	Ongoing	The City reviews and updates the local Emergency Operations Plan in conjunction with Brunswick County

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	along limited access thoroughfares. Where access issues are identified, establish a plan for alternative transportation.							Emergency Management annually.
SP6	Maintain County and Town Stormwater Ordinances in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements. These efforts should also include analysis of stormwater hotspots and potential remedies for these issues.	Flood	High	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDEQ	Ongoing	The City continues to maintain and enforce its adopted stormwater ordinance. The City is currently looking into funding a stormwater master plan to review its current stormwater ordinance, stormwater hot spots and ways to remedy these issues.
SP7	Continue to work to improve CRS rating.	Flood	High	Southport	Brunswick Co Administration Southport Administration NCDPS	General Funds, NCDPS	Ongoing	The City of Southport is already a participant in the Community Rating System. The Hazard Mitigation Plan contributes points to the City's CRS efforts. We were recently given preliminary approval to be a Level 7 CRS Community. The City will continue its CRS efforts.
SP8	Review respective Comprehensive Land Use Plans annually to ensure that the Future Land Use Maps adequately delineates portions of the County/ municipalities deemed unsuitable for development due to existing environmental conditions or other factors outlined in this plan.	All	Moderate	Southport	Brunswick Co Planning Southport Administration	General Funds, NCDPS, NCDEQ	Ongoing	This is an ongoing effort for the City of Southport. The City is currently updating its CAMA Land Use Comprehensive Plan.
SP9	Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood	Flood	High	Southport	Brunswick County Administration,	General Funds, NCDPS	Ongoing	The City recently updated its Flood Damage Prevention Ordinance in August of 2018.

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	hazard events. Additionally, jurisdictions with freeboard requirements adopted at the local level will continue to enforce these minimum standards (Brunswick County freeboard requirements is two feet above BFE).				Southport Administration			Our Freeboard standards are 3 ft. We also adopted some higher regulatory standards such as non-conversion agreements below bfe, and requiring pre-construction, construction, and post construction elevation certificates.
SP10	Periodically evaluate local land development regulations for ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.	Flood	Moderate	Southport	Brunswick Co Administration, Southport Administration	General Funds	Ongoing	This is an ongoing effort for the City of Southport. The City is currently going through a UDO rewrite and CAMA Land Use Plan Amendment process.
SP11	Work closely with NCDOT and the Cape Fear Regional MPO to improve road access standards and protect the integrity of significant traffic-carrying roadways throughout the County. These efforts should specifically target the issue of restriping highway intersections and lane markings for higher visibility.	All	Moderate	Southport	Brunswick Co Administration Southport Administration, NC Department of Transportation Cape Fear Regional MPO	General Funds, NCDOT	Ongoing	This is an ongoing effort by the City of Southport and the County as a whole. The City is an active participant in the Cape Fear RPO along with NCDOT and works with other jurisdictions to allocate points for different projects to maintain and improve our traffic carrying capacity in the region. The Cape Fear RPO also works with the Wilmington MPO and Grand Strand MPO to ensure that everyone is working together to better the carrying capacity for the whole Southeastern Region.
SP12	Review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.	Flood	High	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS, FEMA	Ongoing	This is an ongoing process with the City of Southport. After each Hurricane we assess the damage that we have received and think about what we could do to mitigate future damage.

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SP13	Maintain all FEMA Elevation Certificates, FEMA Floodproofing Certificates for non-residential structures, and where applicable, a V Zone Design Certificate for all structures built or floodproofed since application to the CRS. V Zone Design Certification must be maintained only for structures built subsequent to January 1, 2013.	Flood	High	Southport	Brunswick Co Planning Southport Administration	General Funds	Ongoing	The City continues to maintain FEMA Elevation Certificates, FEMA Floodproofing certificates, and V Zone Design Certificates.
SP14	Review written policies on water and sewer system extensions and tap on policies to ensure that the County is adequately addressing and discouraging inappropriate development in sensitive environmental areas and areas prone to flood or storm surge hazards.	Flood	High	Southport	Brunswick Co Administration Brunswick Co Sewer Districts, Southport Administration	General Funds, Sewer Districts	Ongoing	This is an ongoing process for the City. The City has reviewed its written policies on water and sewer system extensions as well as tap on policies. The City of Southport does not allow grinder pump stations due to their likelihood of being in low lying areas and failing during a storm & flooding events.
SP15	Consider the data and recommendations outlined in this plan when preparing updates to Capital Improvements Plans. All recommendations regarding capital expenditures will focus on siting all infrastructure and public facilities outside of the Flood Hazard Area.	All	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds	Ongoing	The City of Southport continues to consider this hazard mitigation plan when preparing Capital Improvement Plans. The City will continue to focus siting infrastructure and public facilities outside of the Flood Hazard Area when possible.
SP16	Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development. These efforts will be incorporated into the comprehensive planning process.	Flood	Low	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS, NCDEQ	2020-2021	The City of Southport has not done this process yet but needs to. The City will work with the County to use the most recent Floodplain data from 2018 to create an inventory of our lots and structures in the special flood hazard area. Having such a list will also make

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								damage assessment easier after a flood or storm event.
SP17	Support commercial forestry activities, provided significant adverse impacts on natural resource systems are fully mitigated. Such activities should be considered in accordance with the standards and recommendations of the US Forest Service. The County also advocates the voluntary participation of commercial forestry interests in the State of North Carolina's best management practice program for forestry management.	All	High	Southport	NC Forest Service, Brunswick Co Emergency Services Southport Administration	General Funds, NCFS	N/A	The City of Southport does not have commercial forestry activities in its jurisdiction.
SP18	Continue to require 404 wetlands and 100-year floodplain areas to be delineated on all preliminary subdivision plats for lands within and adjacent to the proposed subdivision.	Flood	Moderate	Southport	Brunswick Co Administration Brunswick Co Emergency Operations Center, NCDEQ, Southport Administration	General Funds, NCDPS, NCDEQ	Ongoing	The City of Southport continues to require 404 wetlands and 100-year floodplain areas to be delineated on preliminary subdivision plats for lands within and adjacent to the proposed subdivision.
SP19	Continue to undertake the following actions to support maintenance of safe hurricane evacuation routes: Identify and support improvements to roads that serve as hurricane evacuation routes, post evacuation routes on County and Town websites, perform routine bridge and culvert maintenance, and raise bridges over streams that have documented flooding during significant rain events, support the planning and implementation of regional roadways	Hurricane	High	Southport	Brunswick Co Emergency Operations Center, Southport Administration	General Funds, NCDPS	Ongoing	The City does this from a regional approach, working as a part of the Cape Fear RPO and with NCDOT to identify and support transportation improvements along evacuation routes. The City works with NCDOT to perform bridge and culvert maintenance along state roads. During storm and flood events the City works with the County to get the most up to date information on evacuation routes/road closures and disseminates the

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								information we receive on our website.
SP20	Continue to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of freshwater swamps, marshes, and 404 wetlands.	Flood	High	Southport	Brunswick Co Administration Southport Administration NCDEQ	General Funds, NCDEQ	Ongoing	The City of Southport continues to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of freshwater swamps, marshes, and 404 wetlands. Further, the City has multiple CAMA Local Permit Officers on staff that ensure issue minor development permits on behalf of the Division of Coastal Management.
SP21	Support the relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations. Additionally, the issue of tax base loss should be taken into account within municipal jurisdictions.	Landslide	High	Southport	Brunswick Co Planning NCDPS, Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport does not currently have any issues with structures relocated by erosion but will consider this policy in the event that we do.
SP22	Continue to enforce respective flood damage prevention ordinances and participate in the National Flood Insurance Program. Subdivision regulations will be enforced – requiring elevation monuments to be set so that floodplain elevations can be more easily determined. Additionally, municipalities with freeboard requirements shall continue to enforce this standard locally.	Flood	High	Southport	Brunswick Co Planning Brunswick Co Administration, Southport Administration	General Funds	Ongoing	The City of Southport continues to enforce it's flood damage prevention ordinance as a participant in the National Flood Insurance Program and Community Rating System.
SP23	Continue to support the guidelines of the Coastal Area Management Act and the efforts and programs of the NC Department of Environmental Quality, Division of Coastal Management and the	All	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDEQ	Ongoing	The City of Southport continues to support the guidelines of the Coastal Area Management Act and the efforts and programs of

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of Brunswick County.							the NC Department of Environmental Quality, Division of Coastal Management and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of Brunswick County. As stated earlier, the City of Southport has 3 CAMA Local Permit Officers on staff who enforce CAMA development regulations for minor permits.
SP24	Continue to proactively seek out grant funding through NCEM and FEMA for mitigation of repetitive loss properties (RLPs) from future flood events. The County will maintain a list of RLPs and, on an annual basis, will apply for funding for all structures that meet cost-benefit thresholds as defined by FEMA. The County will assist all municipal jurisdictions in working through the structural mitigation grant funding process.	Flood	High	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport will continue to reach out to repetitive loss properties and attempt to get grant funding through NCEM and FEMA for mitigation of the aforementioned properties.
SP25	Integrate publicly acquired land into public park and greenway systems. These efforts may be carried out through update of the County Blue/Greenway system, as well as municipal planning efforts.	All	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDEQ, NCDOT	Ongoing	The City of Southport continues to integrate publicly acquired land into its park system. The City recently received a tract of land donated by a local family. The City received a PARTF grant to develop the property as a City Park.
SP26	Continue to enforce the NC State Building Code. Local government inspections staff will recertify the NC State Building Code as the adopted local regulation applying	Flood, Landslide	High	Southport	Brunswick Co Inspections Southport Administration	General Funds	Ongoing	The City of Southport Planning & Inspections Department continues to enforce the NC State

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	to all construction activities on an annual basis. Through enforcement of the NC State Building Code, jurisdictions will work to ensure that all structures, including manufactured homes, are properly anchored to minimize potential impacts stemming from a disaster event.							Building Code. Through enforcement of the NC State Building Code, the City of Southport ensures that all structures are properly anchored to minimize potential impacts stemming from a disaster event.
SP27	Consider a policy for contractors to pick up building material and building debris prior to coastal storms.		High	Southport	Brunswick Co Administration Southport Administration	General Funds, FEMA	2020-2021	The City of Southport has an informal policy of requiring contractors to pick up building material and building debris prior to coastal storms. The City will investigate formalizing a policy to pick up/secure building materials and debris prior to coastal storms in order to minimize damage.
SP28	Continue to enforce minimum housing code to require the improvement of substandard housing.	All	High	Southport	Brunswick Co Administration Southport Administration	General Funds	Ongoing	The City of Southport continues to enforce minimum housing code to require the improvement or demolition of substandard housing.
SP29	Continue providing density credits for developments that establish perpetual easements for ecologically sensitive lands.	All	Low	Southport	Brunswick Co Administration Southport Administration	General Funds	2021	The City of Southport does not currently provide density credits for developments that establish perpetual easements for ecologically sensitive areas. The City of Southport will investigate doing so.
SP30	Enhance and develop new public accesses to waterway resources in a manner as to protect sensitive environment areas from development and implement the priority recommendations contained in the Brunswick County Shoreline Access Plan.	All	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport continues to investigate new opportunities to develop new public accesses

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SP31	Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of flood-prone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials).	All	High	Southport	Brunswick Co Emergency Operations Center, Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport works with Brunswick County Emergency Management in an ongoing process to improve hazard warning and response. The City of Southport is included in Brunswick County's CodeRED Program. The City of Southport also works with the Brunswick County Sherriff's office when it comes to controlling vehicles on evacuation routes.
SP32	Continue and expand the program to retrofit schools and other public facilities to serve as emergency shelters.	All	Moderate	Southport	Brunswick Co Schools Brunswick Co Administration, Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport follows Brunswick County's lead when it comes to retrofitting schools and public facilities to serve as emergency shelters. The County currently it's three high schools as the emergency shelters.
SP33	Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters at both the county and municipal level.	All	High	Southport	Brunswick Co Emergency Services Southport Administration	General Funds, N CDPS	Ongoing	The City of Southport Police Department and Fire Department have a well-trained staff that regularly participates in training sessions.
SP34	Evaluate areas with limited evacuation capacity and pursue methods of improving capacity. These efforts will be carried out with support from NCDOT and NCDPS.	All	High	Southport	Brunswick Co Emergency Services Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport continues to work with Brunswick County and NCDOT to improve evacuation capacity. The City also participates in the Cape Fear RPO which also considers these issues in conjunction with NCDOT.

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SP35	Continue debris removal program to correct problem sites at both the County and municipal level.	All	High	Southport	Brunswick Co Emergency Services Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport removes debris on an as needed basis.
SP36	Continue to maintain/enforce an overall cap of 5% on post-development stormwater discharge increase over pre-development conditions through the County's stormwater management program.	Flood	High	Southport	Brunswick Co Engineering Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport continues to enforce the regulations in its Stormwater Discharge Control Ordinance on new development.
SP37	Continue to support efforts to place spoil materials from channel maintenance and dredging on Brunswick County beaches, including each of the incorporated municipalities, as warranted.	All	Moderate	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport continues to support the efforts of local beach communities to receive beach nourishment from channel maintenance and dredging.
SP38	Support Section 206 Lower Lockwood Folly River Aquatic Habitat Restoration Project (removal of sediment bars to increase tidal flushing and improve aquatic habitat).	Flood	High	Southport	Brunswick Co Administration, Southport Administration	General Funds, NCDEQ, NCDOT		The City of Southport does not have a stance on that project, but is open to discussing supporting the project if any of the other communities request it.
SP39	Continue implementation of EPA Phase II requirements. These efforts shall include providing oversight services to county municipalities.	All	High	Southport	Brunswick Co Engineering Brunswick Co Administration Southport Administration	General Funds, NCDEQ	Ongoing	The City of Southport continues to enforce the regulations in its Stormwater Discharge Control Ordinance on new development.
SP40	Incorporate new FEMA digital FIRMs into the County GIS when necessary. This effort shall also include maintenance and inventory of all County land parcel data.	Flood	High	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City continues to incorporate FEMA digital FIRM into it's zoning map and ordinance as needed. The City most recently did this on August 28, 2018. The City will work with the County to inventory all of

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								the land parcel data to reflect the floodplain.
SP41	Establish locations for flood awareness signs – show elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2 feet. Signs should be surveyed to serve as elevation reference marks.	Flood	Low	Southport	Brunswick Co Emergency Services Brunswick Co Administration Southport Administration	General Funds	Ongoing	The City has worked with NCDPS to establish reference levels and benchmarks inside the City in order to better understand the impact of floods and to increase awareness.
SP42	Continue to work closely with real estate agents to ensure that prospective buyers are educated about development within a flood hazard area. The County will prepare materials for dissemination to local real estate agents to assist in this education process. Additionally, materials and information regarding mitigation and retrofitting techniques will be made available on County and municipal websites.	Flood	High	Southport	Brunswick Co Planning Brunswick Co Administration Southport Administration	General Funds, NCDPS, FEMA	Ongoing	The City's Planning & Inspections Department continues to maintain a library of materials to educate community stakeholders with floodplain development. The City of Southport has hardcopies at its office as well as digital resources on its website. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The City of Southport is required to do this as a CRS community. The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The City also now has a CFM on staff

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								that has received further training in order to offer greater assistance to citizens.
SP43	Continue to expand upon the Alert Emergency Notification System available to all residents. Brunswick County Emergency Management will coordinate with all municipal jurisdictions regarding registration through the Brunswick County Emergency Notification Registration Portal.	All	High	Southport	Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport follows Brunswick County's lead on this. Residents from the City of Southport are eligible to register with Brunswick County's CodeRED system. The City also maintains it's website and social media in order to get emergency information out to residents.
SP44	Establish and maintain retrofitting techniques and publicize in the public libraries, and also through citizen newsletters.	All	High	Southport	Brunswick Co Emergency Services Brunswick Co Administration Southport Administration	General Funds, NCDPS	Ongoing	The City's Planning & Inspections Department continues to maintain a library of materials to educate community stakeholders with floodplain development. The City of Southport has hardcopies at its office as well as digital resources on its website. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The City of Southport is required to do this as a CRS community. The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development.

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								These services include guidance regarding development in the defined flood hazard areas. The City also now has a CFM on staff that has received further training in order to offer greater assistance to citizens.
SP45	Coordinate with local churches and Spanish speaking representatives to disperse information about the hazards prevalent in the area and the steps they can take to mitigate these hazards.	All	Moderate	Southport	Southport Administration		Ongoing	The City of Southport has coordinated disaster events with local organizations in the past and will continue to do so.
SP46	Maintain nuclear event preparedness. Develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and training necessary to maintain this preparedness. These efforts should be coordinated with the County LEPC to also include addressing man-made/ technological hazards.	Nuclear	High	Southport	Brunswick Co Emergency Services Southport Administration	General Funds, NCDPS		The City of Southport Fire Department and Police Department communicates with Brunswick County Emergency Services on this matter and participates in training sessions with other jurisdictions in order to prepare them to assist in the event of a nuclear emergency.
SP47	Work closely with the Brunswick County Sheriff's Department on improving the County's multi-jurisdictional communications system in an effort to enhance interoperability.	All	High	Southport	Brunswick Co Sheriff's Office, Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport has continued to work with the Brunswick County Sherriff's Department in order to improve and enhance interoperability of the County's E 911 Communications System.
SP48	Monitor the status of backup generators, communications, and vehicles for all critical public facilities. In addition, develop a list of providers of emergency equipment.	Power-Outage	High	Southport	Southport Administration	General Funds, NCDPS	Ongoing	The City of Southport Fire Department, Police Department, and Public Works Department all work together to monitor the status of backup

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								generators, communications, and vehicles for all critical public facilities. The City recently got new generators installed at City Hall, the Public Works Building, and the Fire Department. The City has a list of providers to go to in case they need emergency equipment.
SP49	Maintain fire event preparedness by ensuring fire hydrants are working properly and coordinating with the NC State Forest Service. These efforts will include the inspection of all fire hydrants. Additionally, County Emergency Services will incorporate the improvement of firefighting procedures into these efforts.	Fire	High	Southport	Brunswick Co Emergency Services Municipal Fire Departments, NC Forest Service Southport Administration	General Funds, NCPDS, NCFS	Ongoing	The City of Southport Fire Department and Public Works Department works together to ensure that fire hydrants are working properly. The City of Southport inspects all fire hydrants and tests them as part of the ISO Rating process.
SP50	Continue to enforce and adopt water shortage response plans and water shortage ordinances for municipalities operating central water service.	Drought	High	Southport	Southport Administration	General Funds, NCDEQ	Ongoing	The City of Southport works with Brunswick County on this issue. The City receives it's potable water from Brunswick County Public Utilities. In the event of a water shortage, the City follows the County's lead.
SP51	Limit development adjacent to the railroad tracks.	Mobile HAZMAT	Moderate	Southport	Southport Administration	General Funds	2026	New action for the 2021 update

Sunset Beach Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
SB1	Inspect all fire hydrants within the Town's corporate limits on a revolving schedule. Through this effort, the Town will aim to inspect each hydrant a minimum of two times per calendar year.	Fire	High	Sunset Beach Fire Department Brunswick County Emergency Services	General Funds, NCDPS	Deleted as part of the 2021 update	This is an ongoing maintenance activity for the Town and will be removed from future plan updates.
SB2	Maintain a pre-disaster debris management contract with a qualified provider. The Town will review and assess this contract every three years.	All	High	Sunset Beach Administration	General Funds	Completed	The Town has a debris management contractor in place. This action will be removed from future plan updates.
SB3	Conduct on-site fire inspections on all non- residential structures a minimum of once annually.	Fire	High	Sunset Beach Fire Department	General Funds	Deleted as part of the 2021 update	This is part of the day-to-day operating procedures of the Fire Department and, as such, is a capability. This action will be removed from future plan updates.
SB4	Maintain a staff level Public Information Officer charged with disseminating information relating to threats associated with man-made and natural disasters. The Public Information Officer's role and duties are defined within the Town's Hurricane Operations Plan.	All	High	Sunset Beach Administration	General Funds	Completed	The Town has a Public Information Officer. This action will be removed from future plan updates.

New Hanover County Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC1	Maintain the County's Continuity of Operations Plan (COOP) and offer support to municipal partners in development and maintenance of their respective COOP planning efforts	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Administration, Municipal Administrations	General Funds, NCDPS	2026	New Hanover County: Continuing COOP development, reviews, and supporting exercise efforts for NHC partners. Carolina Beach: Deferred to County Kure Beach: Deferred to County Wilmington: Currently updating both COOP and EOP to reflect personnel changes made within city organization this past year. Wrightsville Beach: Deferred to County
NHC2	Enhance and maintain County geo-spatial information system (GIS) resources to effectively collect and share datasets to identify hazards and potential impacts, identify opportunities for mitigation and improvement for response, and effectively move toward recovery resulting in a more resilient community.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Information Technology, New Hanover Co Administration; Municipal Administrations, New Hanover Co Emergency Management	General Funds	2026	New Hanover County: Implemented enterprise-wide access to ArcGIS Online (AGOL) with appropriate cyber-security processes in place. Carolina Beach: Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach: Coordinates information and resource sharing with NHC.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC3	Identify locality/municipality level critical infrastructure power needs, assess, explore and install innovative back-up power resources and assets, and maintain existing alternate power infrastructure to support life-safety and critical infrastructure assets to reduce initial damages, and increase community response, recovery, and resiliency capability.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Office of Resilience & Recovery, New Hanover Co Facilities Management, New Hanover Co. Fire/Rescue, Municipal Administrations	General Funds, NCDPS, American Red Cross	2026	New Hanover County: Performing site power assessments and needs assessments with State and local partners; continuing maintenance and integration of resources at established sites. Carolina Beach: Participating with NHC on site power assessments and offering subject matter expertise on municipal critical infrastructure sites. Kure Beach: Participating with NHC on site power assessments and offering subject matter expertise on municipal critical infrastructure sites. Wilmington: Participating with NHC on site power assessments and offering subject matter expertise on municipal critical infrastructure sites. Wrightsville Beach: Participating with NHC on site power assessments and offering subject matter expertise on municipal critical infrastructure sites.
NHC4	Enhance existing community outreach programs available through partner agencies such as Weather-Ready Nation, weather preparedness efforts through National Weather Service, Ready.gov resources through FEMA, and ReadyNHC resources. This includes adapting programs to ensure equity and inclusiveness of	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Administration Municipal Administrations	General Funds	2026	New Hanover County: Implementation of ReadyNHC programming based on resources from NWS, FEMA, and NCEM. Carolina Beach: Completed – Ocean Rescue partnered with NWS on 3/5/20. Maintaining partnership with NHC for

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	the community such as outreach for children, tourist populations, access and functional needs, and potentially underserved populations.							outreach programming and collaboration efforts. Kure Beach: Maintaining partnership with NHC for outreach programming and collaboration efforts. Wilmington: Maintaining partnership with NHC for outreach programming and collaboration efforts. Wrightsville Beach: Maintaining partnership with NHC for outreach programming and collaboration efforts.
NHC5	Support implementation of Stormwater Services projects as identified through system-wide assessments at the watershed-by-watershed level. This includes support for stream cleaning, debris management and removal, animal impediments, and other projects as identified to include natural and man-made structures to improve drainage and mitigate risk to life and damage to property.	Flood	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Engineering, New Hanover Co Administration, New Hanover Co Recovery & Resilience Office; Municipal Administrations	General Funds, Special Revenue Fund, NCDPS, Pre-Disaster Mitigation, Unified hazard Mitigation Assistance, BRICC, NCDEQ, USACE	2026	New Hanover County: Structure for Stormwater Services Program in the unincorporated areas of the County implemented on 07/01/2020. Continue partnership with USDA on the Countywide Beaver Management program. Carolina Beach: Maintaining partnership with NHC for collaboration efforts. Remove beavers as reported and observed through private contractor. Kure Beach: Maintaining partnership with NHC for collaboration efforts Wilmington: Maintaining partnership with NHC for collaboration efforts

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Wrightsville Beach: Maintaining partnership with NHC for collaboration efforts
NHC6	Support and implement training and resources to enforce the NC State Building Code and applicable Fire Code and other safety lifeline codes and ordinances to ensure that all structures, including manufactured homes, are properly anchored, built to minimize potential impacts stemming from a disaster event, and provide technology to support public safety communication lifeline assets.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Inspections Municipal Inspections, New Hanover Co Fire/Rescue, New Hanover Co EM, New Hanover Co 911	General Funds	2026	New Hanover County: Enforcement of the NC State Building Code and Fire Code continues on an ongoing basis. During 2020, NHC began implementation of Section 510 in Fire Code - Emergency Responder Radio Coverage to enhance public safety lifeline communication efforts. Carolina Beach: Completed – Chapter 6 in Code of Ordinances Kure Beach: Partners with NHC for assessment and enforcement efforts. Wilmington: Ongoing through administering Land Development Code Chapter 18. Partners with NHC for assessment and enforcement efforts. Wrightsville Beach: Partners with NHC for assessment and enforcement efforts.
NHC7	Secure funding to retrofit/elevate wastewater pumping stations located in the 100-year floodplain. These infrastructure components routinely flood during flooding and storm surge events.	Flood	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Engineering New Hanover Co Administration Municipal Administrations, Cape Fear Public Utility Authority	General Funds, NCDPS, PDM, UHMA	2026	New Hanover County: CFPUA has mapped all systems, plants and infrastructure in GIS which are in floodplains and could be subject to future SLR. Pump station life-cycle is significantly less than the SLR projection timelines in the 2013 Pilot Study (50, 100 years). As such,

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								current pump station upgrades and future pump stations are designed with flooding and SLR in mind. CFPUA has completed other pump station projects since 2013 that similarly addressed flood elevations as part of an overall upgrade. CFPUA has also initiated an Unmanned Aerial Vehicle (UAS/drone) program which will map elevations of all infrastructure (primarily pump stations) to aid with necessary data. That program is operational. Carolina Beach: Town acquiring funds and pursuing projects when able Kure Beach: Maintains partnership with NHC for assessment and outreach efforts. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
~~NHC8~~	(This action was merged with NHC5 during the 2021 update) ~~Continue to work closely with the US Department of Agriculture to carry out the county-wide Beaver Management Program.~~	~~Flooding~~	~~Moderate~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Engineering New Hanover Co Administration Municipal Administrations~~	~~General Funds, NCDEQ~~	~~2026~~	~~New Hanover County: NHC will continue to work with USDA on the Beaver Management program. This program will also be transitioned to Stormwater Services on July 1, 2021. Please refer to new project~~

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								~~"Stormwater Services" (NHC36) for more information.~~ ~~Carolina Beach: Remove beavers as reported and observed through private contractor~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
NHC9	Adopt updated Flood Insurance Rate Map data and Flood Damage Prevention Ordinance. Continue to evaluate Flood Damage Prevention Ordinance to ensure most effective floodplain management practices are being implemented.	Flood	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Planning Municipal Administrations	General Funds, NCDPS	2026	New Hanover County: Updated Flood Insurance Rate Maps and the Flood Damage Prevention Ordinance were adopted by the Board of County Commissioners on July 9, 2018. Staff regularly evaluates best practices in floodplain management for the consideration of potential amendments to the ordinance. Carolina Beach: Completed – Chapter 30 in Code of Ordinances July 2018 Kure Beach: Coordinates with NHC Wilmington: Adopted FIRM Floodplain maps on August 28, 2018 Wrightsville Beach: Coordinates with NHC
NHC10	New Hanover County Engineering Department will undertake revising the Stormwater Ordinance to	Flood	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington,	New Hanover Co Planning Wilmington Planning; Municipal Administrations	General Funds, NCDPS	2026	New Hanover County: The Stormwater Ordinance Update is underway.

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	address the current conditions located throughout the county.			Wrightsville Beach				An engineering consultant is under contract to update the Stormwater Ordinance to ultimately be placed in the Unified Development Ordinance. The Ordinance will be modified for the creation of Stormwater Services on July 1, 2021. Carolina Beach: Same as NHC Kure Beach: Coordinates with NHC Wilmington: Coordinates with NHC Wrightsville Beach: Coordinates with NHC
NHC11	Update and maintain existing impact and vulnerability analysis on hazard areas to address changes to floodplain, shoreline, and inlet conditions caused by natural and man-made forces and all locally identified key resources and critical facilities that are identified through the county and municipal inventories.	All	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Engineering, New Hanover Co Administration, New Hanover Co EM, New Hanover Co Recovery & Resilience Office; Municipal Administrations	General Funds, NCDEQ, NCEM	2021-2026	New Hanover County: Completed initial Threat/Hazard Identification Risk Analysis (THIRA) in 09/2020. Annual updates and collaboration with relevant stakeholders will occur beginning in 2021. The county performs annual surveys of approximately 130 cross-shore transects along the county's ocean front shoreline, emphasizing the coastal storm damage reduction (CSDR) project templates for Wrightsville Beach, Carolina Beach, and Kure Beach. The county's annual and quarterly coordination of inlet management projects are orchestrated through engineering, surveying and dredging elements of the

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								private sector as well as with state and federal agencies. This project effort is also supported through periodic Hazard Mitigation, Comprehensive Land Use, Parks & Recreation, and Greenway Master planning efforts. In addition to periodic master planning initiatives, the county regularly assesses changes to floodplain, shoreline, inland flooding and inlet conditions caused by natural and man-made forces following disasters. Carolina Beach: Completed – Land Use Plan Update in progress, Parks Master Plan. Partners with NHC for assessment and efforts. Kure Beach: Partners with NHC for assessment and efforts. Wilmington: Partners with NHC for assessment and efforts. Wrightsville Beach: Partners with NHC for assessment and efforts.
NHC12	Identify and leverage resources and outreach opportunities to reduce and mitigate current and future risk for persons located in hazard prone properties, including, but not limited to, acquisition, elevation, retrofitting, and the conservation of open space and scenic areas and provision of public water access.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Administration Municipal Administrations, New Hanover Co Emergency Management, New Hanover Co Office of Resilience & Recovery	General Funds, HMGP, PDM, UHMA, NCORR, SFHA, HUD, CDBG, CBDG-DR, EWP,	2026	New Hanover County: The county sends annual notices to repetitive loss and severe repetitive loss property owners to educate them of potential options available for assistance to include access to acquisition, elevation, and/or retrofitting of properties. Applications for support have been submitted

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						NCDPS, NCEM		to the HMGP Program following Hurricanes Florence and Dorian Carolina Beach: Sent out notices for 2019 FMA Grant. Maintains partnership with NHC for assessment and outreach efforts. Town considers acquisition after storms as well. Kure Beach Maintains partnership with NHC for assessment and outreach efforts. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
NHC13	Enhance CRS programming awareness for the community, focusing on hazard awareness with floodplain development, benefits of, and resources available with participation in the CRS program.	Flood	High	New Hanover County, Carolina Beach, Kure Beach, Wrightsville Beach	New Hanover Co Planning, New Hanover Co Administration Municipal Administrations	General Funds, FEMA	2026	New Hanover County: Public information concerning the economic benefits of participation in the CRS has been created and is available on the county's website. This information is also included on a mailing sent to all residents who own property in Special Flood Hazard Areas in New Hanover County. Press releases were issued this year after official notification of the county's increase to a Class 7 community to provide further public information.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Carolina Beach: Completed – Active participation in CRS program Kure Beach: Completed – active participation in CRS since 2012. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
NHC14	Develop, conduct, deliver, and maintain multi-media all-hazard outreach programming to increase public awareness, preparedness, response, recovery, and mitigation efforts which are inclusive to all populations within the County	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Planning Municipal Administrations, NC Forest Service, New Hanover Communications and Outreach	General Funds, FEMA, NCFS, NCEM	2026	New Hanover County: Numerous outreach efforts to include ReadyNHC, integration with non-English speaking populations, and children have been implemented. The County maintains NHCTV to help share messaging, has a strong social media presence, and incorporates numerous print and radio partners in messaging efforts. Agencies participate in numerous public safety agency outreach efforts centric to fire prevention, crime prevention, and disaster preparedness efforts. The County works with new property owners, contractors, real estate agents, builders, developers, and architects to become familiar with NFIP land use and building standards and principles for quality redevelopment and safe housing development through written materials. These

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								materials are available through local building inspections departments, local library branches, and online. NFIP educational materials are maintained within the applicable departments, local library branches, and online. The County maintains access to the Southeast Regional Hazard Mitigation Plan on several websites for situational awareness for participating partners and the public. Carolina Beach: Maintains partnership with NHC for assessment and outreach efforts. Flood/Emergency Preparedness section on Town Website and mail outs Evacuation information maintained on website for access. Kure Beach: Maintains partnership with NHC for assessment and outreach efforts. Wilmington: City Communications continues to support the Wilmington Fire Department and County agencies with the approved and recommended urban/wildfire interface safety messaging through the sharing of digital and print communications via multi-media platforms, to include live streaming on social media, b-roll for news media, and the regular use of several

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								digital billboards within city limits. City Community Risk Reduction Coordinator regularly collaborates with New Hanover County Fire Prevention Office in various community events and county-wide campaigns to promote best and safest practices for all citizens, and disseminate educational materials. Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
NHC15	Continue to implement standards for Firewise Communities/USA into the subdivision review process, i.e., addressed in local subdivision ordinance.	Wildfire	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Planning New Hanover Co Emergency Management, Municipal Administrations, New Hanover Co Fire/Rescue	General Funds	2026	New Hanover County: Maintain standards and processes in the County's subdivision ordinances Carolina Beach: Completed – Sec. 36-25. (7) Maintains partnership with NHC for assessment and outreach efforts. Kure Beach: Maintains partnership with NHC for assessment and outreach efforts. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for

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								assessment and outreach efforts.
NHC16	Continue to explore technology, resources, and funding options to implement installation of sewer service in portions of the county that still rely on septic systems, particularly in areas that are subject to repetitive flooding.	Flood	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Engineering New Hanover Co Administration Municipal Administrations, Cape Fear Public Utility Authority	General Funds, NCDEQ, NCDPS	2026	New Hanover County: Structure for Stormwater Services Program in the unincorporated areas of the County implemented on 07/01/2020. This project connects with NHC5 and is specific to sewer service. Carolina Beach: Sewer is in place, very few septic; Maintains partnership with NHC for assessment and outreach efforts. Kure Beach: Maintains partnership with NHC for assessment and outreach efforts. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
~~NHC17~~	Merged with NHC14 during the 2021 update. ~~Continue to utilize NHC TV for public service announcements. This outlet is useful for disseminating a range of information including but not limited to natural hazard awareness, evacuation orders, and man-made events.~~	~~All~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Emergency Management, New Hanover Co Administration~~	~~General Funds~~	~~2026~~	~~New Hanover County:~~ ~~Carolina Beach: Deferred to County~~ ~~Kure Beach:~~ ~~Wilmington: The County will be the lead agency responsible for this action moving forward.~~

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								~~Wrightsville Beach:~~
NHC18	Continue to enforce additional land use regulations in Special Flood Hazard Areas, Areas of Environmental Concern through implementation of Zoning Ordinance, Subdivision Ordinance, Flood Damage Prevention Ordinance, and CAMA Minor Permitting Program.	Flood	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Planning Municipal Administrations	General Funds	2026	New Hanover County: The county's land use regulations and CAMA Minor permitting program are administered and implemented on an ongoing basis. Carolina Beach: Completed. Maintains partnership with NHC for assessment and outreach efforts. Kure Beach: Maintains partnership with NHC for assessment and outreach efforts. Wilmington: Maintains partnership with NHC for assessment and outreach efforts. Wrightsville Beach: Maintains partnership with NHC for assessment and outreach efforts.
~~NHC19~~	Merged with NHC12 during the 2021 update. ~~Following a storm event, take advantage of opportunities to acquire or purchase land located in storm hazard areas which are rendered unbuildable or have sustained substantial damage. The property should satisfy objectives including, but not limited to, the conservation of open space and scenic areas and the provision of public water access.~~	~~Hurricane, Flood~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Administration Municipal Administrations~~	~~General Funds, HMGP, UHMA, NCDPS~~	~~2026~~	~~New Hanover County: The county continues to provide outreach to citizens following storm events to make them aware of pre and post disaster grant opportunities. Following Hurricane Florence, 19 applications for acquisition of property were submitted to the Hazard Mitigation Grant Program. Funding from Emergency Watershed Protection (EWP) will address hurricane debris, vegetation and sediment in the~~

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								~~watersheds of the unincorporated county.~~ ~~Carolina Beach: Town considers purchases~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
~~NHC20~~	Merged with NHC11 during the 2021 update. ~~Conduct new assessments of hazard areas periodically to address changes to floodplain, shoreline, and inlet conditions caused by natural and man-made forces. This effort will be carried out through periodic Hazard Mitigation, Comprehensive Land Use, Parks & Recreation, and Greenway Master planning efforts.~~	~~Flood, Hurricane~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Planning, New Hanover Co Administration Municipal Administrations~~	~~General Funds, NCDPS, NCDEQ~~	~~2026~~	~~New Hanover County: The county performs annual surveys of approximately 130 cross-shore transects along the county's ocean front shoreline, emphasizing the coastal storm damage reduction (CSDR) project templates for Wrightsville Beach, Carolina Beach, and Kure Beach. The volumetric calculations are used to assess annual shoreline morphological changes supporting (CSDR) maintenance schedules. The county's annual and quarterly coordination of inlet management projects are orchestrated through engineering, surveying and dredging elements of the private sector as well as with state and federal agencies. In addition to periodic master planning initiatives, the county regularly assesses changes to floodplain, shoreline, inland flooding and inlet conditions caused by natural and man-made forces following disasters.~~

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								~~Carolina Beach: Completed – Land Use Plan Update in progress, Parks Master Plan~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
NHC21	Research, develop, and implement innovative and best practice approaches to floodplain management including density tradeoffs, cluster development regulations, and additional opportunities for land donation and dedication.	Flood	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Planning, New Hanover Co Administration, Municipal Administrations	General Funds, NCDEQ	2026	New Hanover County: Zoning ordinance continues to limit density in Special Flood Hazard Areas, retain Conservation Overlay District standards, and allow cluster development through the performance zoning tool. Staff will be evaluating and considering additional zoning tools to include in land use regulations as part of the Unified Development Ordinance project. Carolina Beach: Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach: Coordinates information and resource sharing with NHC.
NHC22	Continue to develop, maintain, train, exercise, and revise the New Hanover County Health and Human	Illness	High	New Hanover County, Carolina Beach, Kure Beach,	New Hanover Co Health & Human Services – Health	General Funds, ASPR, CDC,	2026	New Hanover County: Using guidance from NCDHHS, CDC, FEM, DHS, and other

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	Services Health Department Preparedness Plan to include the NHCHD Emergency Response, Community Containment, Mass Prophylaxis, Pandemic Influenza, Medical Countermeasure Plans, the Response Plans Development Review policy the Epidemiology (EPI) Team Policy, Radiological Countermeasure Dispensing Plan, and other public-health centric plans that support public safety and wellness.			Wilmington, Wrightsville Beach	Department New Hanover Co Emergency Management, Municipal Administrations	NCEM, NCDHHS		standardized best practices and lessons learned, plans have been developed to the CPG201 standard and HSEEP metrics are used for training and exercise program development. The County has been using these resources to manage the local COVID-19 response and conducts annual flu vaccine clinics to exercise various parts of the noted plans. Carolina Beach: Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach: Coordinates information and resource sharing with NHC.
NHC23	Develop, deliver, facilitate, assess, and revise standardized training and education opportunities to provide the whole community with knowledge, skills, and abilities needed to coordinate preparedness, response, recovery, and mitigation for disasters.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Administration Municipal Administrations	General Funds, NCEM, FEMA, NCDOI, NCDPS, NCOEMS	2026	New Hanover County: Conduct and facilitate all-hazard ICS position specific classes and mandated NIMS coursework. Developed and conducted numerous tabletop and functional exercises that were open to numerous stakeholders and public safety partners. Supported three CERT courses for community partners. Carolina Beach: Town employees are all required to be trained in IC 100, 200, 300,

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								400, 700, and 800 based on position. Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach: Coordinates information and resource sharing with NHC.
NHC24	Expand, maintain, and sustain communication technology to support primary and redundant/backup operational preparedness, response, recovery, and mitigation efforts.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Administration Municipal Administrations, New Hanover Co 911, New Hanover Co Resilience and Recovery Office New Hanover Co Information Technology	General Funds, NCDPS	2026	New Hanover County: Participant on local Public Safety Communications Committee. Sustain radio communications system maintenance contracts and system upgrades. Partner with community stakeholders to enhance Wi-Fi, VOiP and broadband capability across the region. Development of Information Technology Coordination Group to standardize resources and communication efforts enterprise-wide. Carolina Beach: Participant on local Public Safety Communications Committee. Kure Beach: Participant on local Public Safety Communications Committee. Wilmington: Ongoing. all Fire radios are being upgraded with

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								new firmware and the batteries are being reconditioned. Police is currently being assessed. Participant on local Public Safety Communications Committee. Wrightsville Beach: Participant on local Public Safety Communications Committee.
~~NHC25~~	Merged with NHC14 during the 2021 update. ~~Encourage new property owners, contractors, real estate agents, builders, developers, and architects to become familiar with NFIP land use and building standards and principles for quality redevelopment and safe housing development through written materials. These materials are available through local building inspections departments, local library branches, and online.~~	~~Flood~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Planning Municipal Administrations~~	~~General Funds~~	~~2026~~	~~New Hanover County: This is an ongoing effort, and educational materials are maintained within the applicable departments, local library branches, and online.~~ ~~Carolina Beach: Completed – Flood/Emergency Preparedness section on Town Website and mailouts~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
~~NHC26~~	Merged with NHC14 during the 2021 update. ~~Continue public outreach efforts to educate the community about disaster preparedness for all hazards significant to New Hanover County.~~	~~All~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Emergency Management, Municipal Administrations~~	~~General Funds, NCDPS~~	~~2026~~	~~New Hanover County:~~ ~~Carolina Beach: Completed~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
NHC27	Develop, maintain, train, and exercise information regarding Emergency Response and Re-Entry policies and procedures and relevant emergency response	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, Municipal Administrations	General Funds	2026	New Hanover County: Working to secure funding to revise existing EOP resources into one comprehensive document to

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	actions the public can take using emergency management outreach and communication procedures as outlined in the Emergency Operations Plan. All entities should be clear regarding all responsibilities outlined in the Emergency Operations Plan.							support all partners and independent municipalities. Carolina Beach: Completed – Emergency Operations Plan 2016 Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Completed with Emergency Operations Plan 2019. Wrightsville Beach: Coordinates information and resource sharing with NHC.
~~NHC28~~	Merged with NHC14 during the 2021 update. ~~Maintain a website which provides information about the Regional Hazard Mitigation Plan and relevant mitigation measures the public can take. The website will provide opportunity for comments and feedback.~~	~~All~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Administration Municipal Administrations~~	~~General Funds~~	~~2026~~	~~New Hanover County: The Southeastern North Carolina Hazard Mitigation Plan is available on the New Hanover County Department of Emergency Management's website.~~ ~~Carolina Beach: Completed – Flood/Emergency Preparedness section on Town Website~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~
NHC29	Advocate and support efforts to coordinate with the NC Department of Transportation, relevant stakeholders, and participating jurisdictions to study,	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, Municipal Administrations, New	General Funds, NCDPS, NCDOT,	2026	New Hanover County: Through existing partnerships, projects have been identified to enhance drainage along frequently flooded

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	identify, fund, execute and maintain evacuation routes and other transportation infrastructure assets in the event of a natural or man-made disaster for more resilient road visibility and infrastructure to support current and future evacuation efforts.				Hanover Co. Office of Recovery & Resilience, New Hanover County Planning, New Hanover County Engineering	HMGP, BRICC		infrastructure that serve as primary evacuation routes which are awaiting funding and coordination with ongoing NCDOT projects. Carolina Beach: Completed. Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach: Coordinates information and resource sharing with NHC.
~~NHC30~~	Merged with NHC14 during the 2021 update. ~~Publicize on county/municipal websites maps of evacuation routes which will facilitate the evacuation of all coastal portions of the county in case of a hazardous event.~~	~~All~~	~~High~~	~~New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach~~	~~New Hanover Co Emergency Management, Municipal Administrations~~	~~General Funds, NCDPS~~	~~2026~~	~~New Hanover County: Information on evacuation routes is maintained on the Department of Emergency Management's website as part of the Ready NHC initiative.~~ ~~Carolina Beach: Completed – Emergency Preparedness section on Town Website~~ ~~Kure Beach:~~ ~~Wilmington:~~ ~~Wrightsville Beach:~~

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC31	Continue to develop, maintain, train, and exercise with the various county/municipal fire departments to assure adequate fire protection during fire events, to include training, exercising, and developing response and recovery efforts for all fire-centric incidents including wildland/urban interface incidents.	Wildfire	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, Municipal Fire Departments, New Hanover Co Office of Resilience & Recovery	General Funds	2026	New Hanover County: Review and update existing MOUs. Develop and execute training and exercise opportunities with partner agencies. Enhancing outreach on WUI efforts to include defensible space and proper vegetative inclusion efforts. Defining and supporting efforts for effective and equitable policies and processes to support fire partners Carolina Beach: Ongoing Coordinates information and resource sharing with NHC. Kure Beach: Coordinates information and resource sharing with NHC. Wilmington: Coordinates information and resource sharing with NHC. Wrightsville Beach:

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC32	Procure additional emergency generators for wastewater pump stations within the floodplain. Assign fixed or portable generators as appropriate for site location.	Flood	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Administration Municipal Administrations, Cape Fear Public Utility Authority, New Hanover Co Emergency Management	General Funds, NCDPS, FEMA, BRICC	2026	New Hanover County: Supports collaboration and coordination with CFPUA This project also aligns with NHC3. Carolina Beach: Complete. Supports collaboration and coordination with CFPUA Kure Beach: Supports collaboration and coordination with CFPUA Wilmington: Supports collaboration and coordination with CFPUA Wrightsville Beach: Supports collaboration and coordination with CFPUA
NHC33	Maintain vegetation-free perimeter buffers around groundwater well sites, pump stations, and drinking water storage tanks to mitigate wildfire hazards to critical infrastructure	Wildfire	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Administration Municipal Administrations, Cape Fear Public Utility Authority, New Hanover Co Emergency Management, New Hanover Co Office of Resilience and Recovery	General Funds, NCDPS, NCDEQ, BRICC	2026	New Hanover County: CFPUA actively maintains vegetative buffers around infrastructure (tanks, wells, pump stations). Supports collaboration and coordination with CFPUA Carolina Beach: Complete Supports collaboration and coordination with CFPUA Kure Beach: Supports collaboration and coordination with CFPUA Wilmington: Supports collaboration and coordination with CFPUA Wrightsville Beach: Supports collaboration and coordination with CFPUA

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC34	Continue to enforce and adopt water shortage response plans and water shortage ordinances for municipalities operating central water service.	Drought	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover County Administration Municipal Administrations, Cape Fear Public Utility Authority, New Hanover Co Emergency Management	General Funds, NCDEQ	2026	New Hanover County: CFPUA has a formal Water Emergency Event (Incident Action Plan) in place. This also applies to the City of Wilmington (entire City is in the CFPUA service area) and portions of the County excluding the beach towns. Carolina Beach: In-progress Supports collaboration and coordination with CFPUA Kure Beach: Supports collaboration and coordination with CFPUA Wilmington: See County Response Supports collaboration and coordination with CFPUA Wrightsville Beach: Supports collaboration and coordination with CFPUA

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC35	Work with industry to develop emergency response plans for specific industries and ensure that all plans are fully coordinated with County emergency management plans. These efforts will be carried out in conjunction with the County LEPC.	All	Moderate	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co LEPC, New Hanover Co Emergency Management, Municipal Administrations	General Funds	2026	New Hanover County: Chairs regional LEPC and works to support private sector partners with Tier 2 reporting and planning development Carolina Beach: In-progress Supports collaboration and coordination with NHC; participates on LEPC Kure Beach: Supports collaboration and coordination with NHC; participates on LEPC Wilmington: Supports collaboration and coordination with NHC; participates on LEPC Wrightsville Beach: Supports collaboration and coordination with NHC; participates on LEPC
NHC36	Conduct Security/Privacy Risk Assessments- identify risks to organizational operations, organizational assets, and individuals. Identify and document vulnerabilities.	Cyber (attacks and data breach)	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	NHC Information Technology, New Hanover Co Emergency Management, Municipal Administrations	General Funds	2021-2026	New action for the 2021 Plan Update
NHC37	Continue to expand and improve upon bolstering local government computer network and systems against cyber threats by implementing industry-standard cyber security practices and compliance with cyber security standard frameworks such as NIST, SANS and applicable compliance requirements such as CJUS, HIPAA, and PCI.	Cyber (attacks and data breach)	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	NHC Information Technology, New Hanover Co Emergency Management, Municipal Administrations	General Funds	2021-2026	New action for the 2021 Plan Update

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NHC38	Develop, educate, execute, and fund processes and projects which include fortified areas of refuge in new building and retrofit projects to strengthen critical infrastructure and key resource sites from natural and man-made hazards.	All	Medium	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Office of Resilience and Recovery, NHC Facilities Management, New Hanover Co IT, New Hanover Co Planning, New Hanover Co Communications & Outreach NHC Fire Rescue, Municipal Administrations	Fire District, HMGP, FEMA, BRICC	2026	New action for the 2021 Plan Update
NHC39	Evaluate, assess, fund, conduct and support implementation of studies and projects to decrease instances of extended power outages and severity of impacts to critical infrastructure and key resources.	All	High	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Office of Resilience and Recovery, Municipal Administrations, Private Sector	General funds, FEMA, NCDEQ, Private sector	2026	New action for the 2021 Plan Update
NHC40	Evaluate, develop, and support implementation of infrastructure, programs, and other resources to reduce food insecurity issues that are directly affected by natural and man-made hazards to enhance mitigation, recovery and resilience efforts.	All	Low	New Hanover County, Carolina Beach, Kure Beach, Wilmington, Wrightsville Beach	New Hanover Co Emergency Management, New Hanover Co Office of Resilience and Recovery, Municipal Administrations, Private Sector	General funds, SBA, BRCC, Private sector	2026	New action for the 2021 Plan Update
NHC41	Reduce risk and enhance community resilience by conducting ongoing housing vulnerability and gap analyses, community outreach program(s), and supporting the creation of incremental resilient affordable and workforce housing.	All	Medium	New Hanover County, Wilmington	New Hanover Co Emergency Management, New Hanover Co Office of Resilience and Recovery, Municipal Administrations, Private Sector	General funds, SBA, BRCC, CBDG, NCORR Private sector	2026	New action for the 2021 Plan Update

Wilmington Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
ILM1	Maintain internal policies and procedures to support City employees in responding to emergency situations. Policies and procedures will include, but will not be limited to, an Inclement Weather Policy.	All	High	Wilmington Administration	General Funds	2026	The City will continue to seek opportunities to develop and improve, where necessary, internal policies and procedures. City of Wilmington has established Inclement Weather Policies
ILM2	Continue to provide training for City personnel through FEMA's Emergency Management Institute (EMI) including ICS 100, ICS 200, ICS 300, ICS 400, ICS 700, and IS 800.	All	High	Wilmington Administration	General Funds	2026	The City of Wilmington continues to provide access to FEMA's Emergency Management Institute ICS training
ILM3	Partner with the County to incorporate hazard mitigation educational materials in existing communication vehicles such as city newsletters and city/county websites.	All	High	Wilmington Administration, New Hanover County Emergency Management	General Funds	2026	The City of Wilmington continues to work with New Hanover County on hazard mitigation education materials

Onslow County Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	GIS staff will maintain a map and listing of streets that will be used for evacuation in the event of a hurricane.	Flood, Hurricane	High	GIS, Emergency Management, Police	General Funds, NCDPS	Completed	COMPLETED: County participated in the NCEM Know Your Zone Initiative. Evacuation Zones have been created and new evacuation maps will be published after the official launch.
P2	Onslow County's flood plain map will be modified prior to the new FEMA flood maps being approved.	Flood, Hurricane	Medium	GIS, Planning Dept.	General Funds	2021	DEFERRED: Preliminary FIRM data has been made available through the County GIS system both in house and to the public. Awaiting adoption of maps.
P3	Monitor all development sites to ensure storm water controls are in place and are maintained. Based on storm water permits.	Flood	Low	Planning Department, State	General Funds	Deleted	DELETED: Onslow County works with State DEQ, as the issuing authority, to address concerns and issues. This action will be removed from future plan updates.
P4	Onslow County will rely on its existing ordinances and land use controls to regulate development within the floodplain. Ensure codes and ordinances are enforced during the permitting and construction processes. Monitor sensitive areas for unpermitted construction activities.	Flood	Medium	Planning Dept.	Local	2021	DEFERRED: Onslow County is in the process currently of updating zoning and subdivision ordinances
P5	Pursue State and Federal grant funds to assist in the implementation of the recommendations included in this plan.	All	Medium	Emergency Management, Planning Department	NCDPS Grants, FEMA Grants	2026	DEFERRED: Onslow County continuously seeks additional funding sources for mitigation planning and response.
P6	Apply for Community Rating System (CRS) classification and pursue CRS credit points for having this multi-hazard plan in place.	Flood	High	Planning Dept.	General Funds	Completed	COMPLETED: Awarded CRS Rating 7 in late 2015. Will continue working to maintain or improve the rating.
P7	Adopt a policy prohibiting the development of critical public facilities in the l00-year floodplain in cases where viable alternatives exist. Such a policy could be enforced through the County's floodplain and subdivision ordinances and permit issuance process.	Flood	Medium	Administration, Planning Dept.	General Funds	2022	DEFERRED: Need to review. Continue to review all critical facilities to ensure they are in compliance. Critical facilities have been mapped. Recommend amendment to flood ordinance.
P8	Onslow County will encourage projects undertaken by the County's Sheriffs,	All	Medium	Administration, Planning	General Funds	2020	COMPLETED: Initial Threat Hazard and Identification Risk Assessment were conducted in 2020.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	Emergency Services Director, Fire-Rescue- EMS, Planning, Inspections, and Parks and Recreation Departments that will lessen the vulnerability of the County and its residents to natural hazards.			Department, Emergency Services, Sheriff's Office, Parks and Recreation			
P9	Maintain database of sinkhole incidences throughout the County to include location, type, and approximate size. Update mapping as needed. Monitor to ensure critical facilities are not constructed in a high hazard area.	Subsidence	Medium	Planning Department, Emergency Management	General Funds	Completed	COMPLETED: Sinkhole report data is stored in both Planning databases and WebEOC databases. Updated with new occurrences.
P10	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing, anchoring fixed building equipment.	All	Medium	Administration, Asset & Facilities Maintenance, Planning Dept., Emergency Services	General Funds, NCDPS Grants	2026	DEFERRED: Additional facilities are being considered for retrofits and upgrades. New facilities (County Govt. Center, CHS facility, New Animal Services Facility) upgrades, are being built with COOP in mind as well as better hazard resiliency. Continue to look for methods to address vulnerabilities of critical infrastructure.
P11	Overhaul the County's Continuity of Operations Plan (COOP) to ensuring that updates are completed in accordance with current Onslow County policy and structure.	All	High	Emergency Services, All Departments	General Funds	2023	NEW ACTION in 2021
				PROPERTY PROTECTION			
PP1	The Onslow County Geographic Information System's staff will use flood plain, parcel, and aerial data to map specific flood plain areas. This will allow for future hazard mitigation community outreach by educating all citizens on the dangers of living in the flood plain.	Flood	High	GIS, Planning Department	General Funds, Grants	Deleted	DELETED: Capability is maintained through GIS and the Planning Department. Both Preliminary and Effective FIRMS are available to the citizens. Both preliminary (new) and effective flood plain maps are maintained on the GIS server and are available to both County agencies and citizens.
PP2	Onslow County will support its storm hazard mitigation policies provided in the 2008 Onslow *County Coastal Area Management Act (CAMA) Land Use Plan*.	Flood, Hurricane	Medium	Planning Dept.	General Funds	2024	DEFERRED: Onslow County will be undertaking a reevaluation of the CAMA and its own Land Use Plans.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PP3	Encourage surveyors, engineers, and land planners to become familiar with the NFIP land use and building standards by distributing copies of the NFIP land use and building standards from the County's inspections department when applicants apply for permits	Flood	Medium	Planning Dept.	General Funds	Deleted	DELETED: Onslow County now participates in the CRS Program and distribution of NFIP materials are ap art of the education program. Capability is maintained through planning, permitting, and inspections.
PP4	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	Medium	Administration Emergency Services, Asset & Facility Maintenance	General Funds, Grants	2026	DEFERRED: Onslow County has applied for HMGP funds for 2 generators for emergency shelters. 2 new emergency shelter facilities are being constructed with generators included. County critical facilities are being constructed with generators or transfer switches.
PP5	Develop new ingress/egress rules in the subdivision ordinance applying to the construction of all new neighborhoods. Ensure safe access in and out of neighborhoods during fires, flood events, or other hazard and prevent a single point of failure to evacuation by ensuring all neighborhoods have 2 access points.	All	Medium	Planning Department	General Funds	2022	NEW ACTION in 2021
PP6	Onslow County will update aerial imagery every 2 to 4 years utilizing local aerial projects (pictometry, etc..) or state mapping projects.	All	Medium	GIS	General Funds NCDPS	2024	NEW ACTION for 2021
NATURAL RESOURCE PROTECTION							
NR1	Onslow County shall encourage the long-term management and wise use of its natural resources including, particularly, ocean and estuarine area resources, surface wetland and floodplain ecosystems, and other important natural areas.	All	Medium	Planning Dept.	General Funds	Deleted	DELETED: Capability is maintained through the Planning Department policies and plans.
NR2	Onslow County encourages the prevention of premature conversion of large areas of productive agricultural land to development and to protect valuable environmental areas from destruction	All	Medium	Planning Dept.	General Funds	Deleted	DELETED: Capability maintained by the Planning Department through policies and plans.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
EMERGENCY SERVICES							
ES1	Onslow County will educate its staff on the HAZUS software endorsed by FEMA.	Flood, Hurricane	Medium	Emergency Management, GIS	General Funds, FEMA	2026	DEFERRED: GIS will be sending personnel to attend updated HAZUS training.
ES2	Emergency Management and the Planning Department will work in conjunction to identify and maintain a list of all repetitive and severe repetitive loss properties within Onslow County and will attempt to seek grant funding to help mitigate the properties.	Flood	High	Planning Department, Emergency Management	General Funds, FEMA Grants	2026	DEFERRED: Onslow County continuously works to Reduce the number of repetitive loss structures in the County.
ES3	Onslow County Volunteer Fire Departments will provide additional services during the times of emergency/ disasters.	ALL	Low	Emergency Services, Volunteer Fire Departments	General Funds	2021	DEFERRED: Contracts are planned to be updated in 2020. Fire/Rescue Committee meets quarterly to review issues, contracts and needs.
ES4	Onslow County will support its *Emergency Operations Plan (EOP)*.	All	High	Emergency Management, Board of Commissioners	General Funds	2021	DEFERRED: The Onslow County Emergency Operations Plan is undergoing a complete realignment to match CPG 101, NC EOP, and post-Florence after action recommendations.
ES5	Build out of new county wide interoperable P25 800MHz radio system that will include all agencies. System will provide for full interoperability between all agencies during disaster and emergency response.	All	High	Emergency Services	General Funds, Grants	Completed	COMPLETED: System has gone live and is under maintenance contracts.
ES6	Develop a countywide database for managing NIMS training standards to include ICS 100,200,300,400,700,800 and additional courses as needed.	All	Low	Emergency Services ITS	General Funds	2022	NEW ACTION in 2021
STRUCTURAL							
S1	Onslow County will pursue the acquisition of properties in flood prone areas when they are substantially damaged and meet the BCA requirements for acquisition. A re-use plan will be identified during the scoping process. Deed restrictions should be placed on properties that are acquired to prevent development.	Flood, Hurricane	Medium	Planning Department	General Funds, Grants	2026	DEFERRED: Onslow County submitted 13 residential structures for acquisition/elevations under the Florence HMGP funds

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
S2	Onslow County will support the elevation of structures above base flood elevation as an alternative when acquisition is not possible. Emphasis should be placed on structures located within the County's Repetitive Loss Areas. All elevations should meet State specifications and prioritization should be based on benefit/ cost rather than flood height. This action is based on the voluntary participation of property owners.	Flood	Medium	Planning Dept.	General Funds, Grants	2026	DEFERRED: Onslow County submitted 13 residential structures for acquisition/elevations under the Florence HMGP funds
S3	The County will maintain a computer database of all mitigated structures through county-sponsored projects.	ALL	Medium	Planning Dept.	Local	Deleted	DELETED: Capability is maintained by marking all properties with deed restrictions. GIS will maintain a layer identifying all mitigated properties.
S4	County will develop a vulnerability assessment database of all of its identified critical infrastructure to include assessment for emergency generators when one is not already established. Develop necessary mitigation to identified hazards.	All	Medium	Emergency Services Human Resources	General Funds	2025	NEW
				PUBLIC INFORMATION			
PI1	Onslow County will continue to educate its citizens on the importance of conserving water.	Drought	Medium	ONWASA	General Funds, Grants	2026	DEFERRED: Will integrate into CRS activities and will work with ONWASA and Cooperative Extension to provide information to citizens.
PI2	Develop, enhance, and implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses, and schools.	All	Medium	Emergency Management	General Funds, Grants	2024	DEFERRED: Onslow County is updating brochures, for several hazards including sinkholes, hurricanes, and evacuation.
PI3	Ensure that the Onslow County website maintains updated documents about flood insurance, flood protection,	Flood	Low	Planning Department,	General Funds	Deleted	DELETED: Capability is maintained as a part of the CRS public education section.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	floodplain management, and natural and beneficial functions of floodplains.			Emergency Management			
PI4	Educate local real estate agents about the Onslow County website's NFIP and flood hazard information that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing.	Flood	Low	Planning Department	General Funds	Completed	COMPLETED: Meet annually with local Board of Realtors about zoning, flood issues, and Florence outreach with FEMA
PI5	Send a flood protection flyer to all properties in the County through a document that that is distributed to all residences. The flyer should include the following information: a general identification of the local flood hazard, flood safety, flood insurance, property protection, floodplain development permit requirements, and drainage system maintenance. In addition, the flyer should specifically state that although a particular house may not require flood insurance that does not mean that a garage or outbuilding on the property is not subject to flooding.	Flood	Medium	Planning Department, Emergency Management	General Funds, Grants	2026	DEFERRED: Working to integrate as a part of CRS capabilities. Reached out to properties in floodplain with information about rebuilding in the floodplain after Florence. Coordinate with tax office for an insert with next year's tax letters.
PI6	Provide information on the Onslow County website that explains what you can do to protect your property from wildfires. This should include ways for individuals to stay safe in addition to ways to prevent property loss.	Wildfire	Low	Emergency Mgmt.	Local	Short-Term 1-5 years	Will work to get the information stood up and ensure that it is updated annually. Currently under development. Should be completed in 2021.
PI7	Provide material on the Onslow County website regarding the hazards of thunderstorms, lightning, and hailstorms. This should include danger signs, what kind of disaster supplies would be needed, and ways to help prevent loss of life and/or property.	Severe Thunder-storm	Low	Emergency Mgmt.	General Funds, Grants	Completed	COMPLETED: Updated hazard information and risk assessment were completed for the 2021 Hazard Mitigation Plan. All information has been made available on the County website under the hazard mitigation section.
PI8	Provide brochures on the Onslow County website explaining to residents what to do if they find a sinkhole on agricultural land, on commercial or industrial sites, or at their residential property	Subsidence	Low	Emergency Mgmt.	General Funds, Grants	2024	DEFERRED: Onslow County is in the process of updating several hazard specific brochures to include sinkholes, hurricanes, and evacuations.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PI9	Provide material at the Inspections Department on how to select a qualified contractor and what recourse people have if they are dissatisfied with a contractor's performance.	All	Low	Planning Dept.	General Funds	Deleted	DELETED: Capability is maintained by Planning Department.
PI10	Have the County Fire Marshal, or designee, speak at area schools and civic groups regarding the risk of wildfires in Onslow County, and what they as citizens can do to help prevent them.	Wildfire	Low	Emergency Services	General Funds, Grants	Deleted	DELETED: Capability is maintained as a function of the Fire Marshal job responsibilities.

Holly Ridge Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	The Town will develop an evacuation strategy for hazardous material response. This will be applied Town-wide.	Flood, Hurricane	High	Fire Department, Police Department	Local Staff Time and Labor	2020-2021	Completed. Strategies and procedures are outlined in the Holly Ridge Disaster Response Plan previously updated 8/31/2017. Annual updates are to be made and implemented.
P2	Holly Ridge will encourage projects undertaken by the Holly Ridge Police Department & Holly Ridge Fire Department that will lessen the vulnerability of the Town and its residents to natural hazards.	All	Medium	Town Manager, Fire Department, Police Department	Local Staff Time and Labor	2020	Completed. Hazard Mitigation Plan adopted 20___ Signed MOU with all county law enforcement agencies for mutual aid response. Signed MOU with all county law enforcement agencies for mutual aid response. Continued training implemented by Police and Fire.
P3	Limit the amount of impervious surface for each lot to minimize storm water runoff in accordance with the Town of Holly Ridge Town Code and CAMA Regulations.	Flood, Hurricane	High	Code Enforcement, Planning	Local, Grants	2020-2022	Completed. Stormwater regulations provided under State requirements. Engineered plans and State permits required prior to approval of land disturbing activities. Local permitting and ordinance to be established. This is New.
P4	Pursue State and Federal grant funds to assist in the hazard mitigation recommendations included in the plan.	All	Medium	Town Manager	UHMA Grants	2020-2021	New. Review available grants on an annual basis to determine if they apply. No grants were identified during the review period.
P5	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing, anchoring fixed building equipment.	All	Medium	Buildings and Inspections, Planning Dept., Emergency Services, Maintenance	Local, State Grants, UHMA Grants, other federal grants	2020-2021	Completed. Permanent backup generator installed for Town Hall and the Police Department. Continued analysis of any additional critical facilities to take place. This is New.
				PROPERTY PROTECTION			
PP1	Perform annual assessment town wide of ditches to ensure proper grading. Coordinate with NCDOT for repairs to ensure proper drainage. A complete list of all ditching and possible problem areas will be included in the Street Plan	Flood, Hurricane	High	Maintenance Department	Local Staff Time and Labor	2020-2021	Completed. List of areas generated through maintenance which is updated annually to identify additional problems. All areas are annually maintained with the currently recognized problem areas cleared twice a year.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	and updated annually to help prevent flooding.						
PP2	Meet with representatives from MCB - Camp Lejeune, NC Forestry Service, Onslow County Emergency Services, and local fire depts. to update response plans to wildfires on base property which may also affect Town boundaries.	Wildfire	High	Town Manager Town Clerk, Code Enforcement, Fire Department	Local	2020-2021	New. Updates to the response plans need to be made. Coordination with the Holly Ridge Fire Department and Onslow County Emergency Services will continue to take place.
PP3	Make use of the Holly Ridge flood plain, parcel data, and aerial photographs in digital format. The Onslow County GIS is capable of overlaying this coverage on its geographic information system (GIS) and furnishing the Town of Holly Ridge with this support.	Flood	High	Code Enforcement, Planning	Local Staff Time and Labor	2020-2021	Deferred. Holly Ridge utilizes the Onslow County GIS and parcel data which continually updates the Holly Ridge area based on information received from Holly Ridge and FEMA.
PP4	Require structures damaged by more than 50% be rebuilt in compliance with current standards.	Flood, Hurricane	High	Code Enforcement, Planning	Local Staff Time and Labor	2020	Completed. Section 7-6-4 of Holly Ridge Ordinance and State Building Codes requires structures damaged more than 50% to be rebuilt in compliance with current standards.
PP5	Require a 2-foot freeboard for all new construction in accordance with current standards.	Flood, Hurricane	High	Code Enforcement, Planning	Local Staff Time and Labor	2020-2021	Completed. Holly Ridge Flood Damage Prevention Ordinance adopted 8/31/17 requires 2-foot freeboard. Updated ordinance, as required by State, to be adopted June 2020.
PP6	Enforce a 40 foot height maximum for new structures in accordance with the current standards	Hurricane	Medium	Code Enforcement, Planning	Local Staff Time and Labor	2020-2021	Completed. Holly Ridge Town Ordinance Section 7-3 requires height of structures maxed at 40'. Verification from surveyor required prior to CO.
PP7	Enforce the VE Zone Construction standards in accordance with the Town of Holly Ridge Flood Ordinance.	Flood, Hurricane	High	Code Enforcement, Building Inspections	Local Staff Time and Labor	2020-2021	Completed. Holly Ridge Ordinance requires elevation certificates be provided prior to CO being issued. Potential engineer certifications may be required based upon project.
PP8	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	medium	Emergency Services, Facilities Maintenance	UHMA, Local Staff Time and Labor	2020-2021	Completed. Backup generator with transfer switch installed at Town Hall and Police Department. Inspection completed by cert. inspector twice annually, with monthly local inspection
EMERGENCY SERVICES							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
ES1	Maintain backup generators to supply electricity to critical Town facilities during periods of power outage. This applies Town-wide.	Hurricane, Winter Storm	High	Town Manager	Local	Annual	Completed. Performed monthly inspections and testing.
ES2	Establish a procedure to assist with evacuation of residents at the local assisted living facility, should this become necessary.	All	High	Town Manager Police Department	Local	Annual	Deleted. Facility has closed, but unsure if another facility will reopen. Leaving Mitigation action for this reason.
ES3	Develop a registry for special needs residents in Town.	All	High	Town Manager, Town Clerk, Police Department	Local Staff Time and Labor	2020-2021	New. Holly Ridge has developed list for residents confined to their homes for them to be checked on. This list is continually being developed and updated on an annual basis or as more residents are identified.
ES4	Review and update the Holly Ridge Police Standard Operating Procedures.	All	Medium	Police Chief	Local	2020-2021	New. The Procedures are reviewed annually. Changes are made, as they are found necessary. Some changes were required during this period.
ES5	Review, update and test the Town's existing Disaster Response Plan	Flood, Hurricane	High	Town Manger	Local Staff Time and Labor	2020-2021	New. The Disaster Response plan has been developed. Some updates are needed related to contacts as some are no longer with Holly Ridge. Additional updates are included as necessary.
PUBLIC INFORMATION							
PI1	Set up a pamphlet rack in the Town hall to provide public safety and hazard preparedness information.	All	Medium	Town Clerk	Local Grants	Annual	Completed. Town Staff will work to obtain a rack to be placed in the Town Hall and public safety and hazard information will be updated continuously.
PI2	Work with the County to ensure implementation of a viable public education and outreach program for mitigation, preparedness, response, and recovery.	All	High	Town Manager	Local	Annual	Deferred. Holly Ridge will continue to work with Onslow County Emergency Services to ensure coordination throughout Holly Ridge.

Jacksonville Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	Actively pursue state and federal grant funds to assist in the hazard mitigation recommendations included in the plan.	All	Medium	All Departments	Local		Delete –The City consistently researches and applies for state and federal grant funding to assist with hazard mitigation recommendations.
P2	Jacksonville will encourage projects undertaken by the Jacksonville Police Department, Jacksonville Fire & Emergency Services Department, Public Services, Development Services and Parks and Recreations Departments that will lessen the vulnerability of the City and its residents to natural hazards.	All	Medium	All Departments	Local		Complete -The City meets with stakeholders and reviews mutual and automatic aid agreements on an annual basis.
P3	The mitigation strategies will be reviewed at least yearly to evaluate progress on the mitigation strategies selected and identify new strategies.	All	Medium	All	Local		Complete – The City reviews mitigation strategies as part of the overall Southeastern NC Regional Hazard Mitigation Plan on an annual basis. The City will continue this practice.
P4	Stay current with all Community Rating System reporting requirements to ensure continued program participation. Actively pursue activities that will lower our CRS rating.	Flood	High	CRS Coordinator	Local	2021	Deferred evaluation and report submitted to ISO for CRS credit. Currently working on 5-year review, Community Assistance Visit will take place in Summer 2020.
P5	Request courtesy review by the State NFIP Coordinator's office to identify areas where Jacksonville could acquire additional CRS credit points. Apply for CRS re-certification, if applicable.	Flood	Low	CRS Coordinator	Local		A courtesy review was provided by the State Complete - NFIP Coordinator's office and identified areas where Jacksonville could acquire additional CRS credit points. The CRS Coordinator applies for re-certification when improvements are made. This action maintains the City's rating at the lowest possible number. Note: Since the inception of this Plan in 2004, the City's CRS rating has been reduced from a nine to a seven. It is the City's policy to reduce

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
							the rating further when possible and as budget considerations allow.
P6	Jacksonville will maintain compliance with State wellhead protection requirements.	Flood	High	Developmental Director, Public Services Director	Local		Complete – The City is in compliance with all State wellhead requirements.
P6	The requirements placed upon the City by its NPDES Coastal Rules Stormwater permit are intended to help prevent increases in the frequency, duration and intensity of repetitive flooding.	Flood	Medium	Engineering	Local		Complete - NPDES Stormwater permit was issued on March 1, 2017.Next permit application period will be 2022.
P8	The City utilizes the NC state building code requirements for new installations of mobile homes.	All	Medium	Development Services and Code Enforcement	Local		Complete – The City presently utilizes NC Building Code requirements for new installations of mobile homes.
P9	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing, anchoring fixed building equipment.	All	Medium	Buildings and Inspections, Planning Dept., Emergency Services	Local, State Grants, UHMA Grants, other federal grants		Complete – The City presently adheres to this practice.
PROPERTY PROTECTION							
PP1	Make use of Jacksonville's flood plain, parcel data, and aerial photographs in digital format. The City is capable of overlaying these coverages on its geographic information system (GIS). This is an existing program	Flood	Medium	ITS	Local		Complete - Staff will continue to existing staff and capabilities, in addition to assistance from the Onslow County GIS staff and the North Carolina Floodplain Mapping Information System when issuing permits. Data is reviewed for accuracy and completeness annually.
PP2	Acquire and maintain backup generators for lift stations and water wells and to supply electricity to	All	High	Public Services	Local	2023	Deferred – Backup generators in place for most critical stations and portable generators for use with less critical stations. The City continually

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	critical City facilities during periods of power outage.						analyzes the need for permanent versus portable emergency power for infrastructure.
PP3	Electrical panels are to be positioned above the floodplain at three sewer pumping stations.	Flood	High	Public Services	Local	2024	Deferred – The city has all electrical panels in place that are positioned above the floodplain with the exception of 3 locations. These are currently being addressed through the capital improvement program.
PP4	The City utilizes NC state fire code requirements for securing LP tanks and aboveground fuel tanks in areas subject to flooding. The Department of Public Safety periodically inspects commercial properties for these and other potential problems according to the schedule established by City Code and NC State Fire Code. This item is also addressed in periodic public awareness media regarding hurricanes and flooding.	Flood	Medium	Public Safety, Development Services and Code Enforcement	Local		Complete – The City utilizes the 2018 NC Fire Prevention Code requirements as related to this description. The City also performs state mandated fire inspections of commercial and multi-family occupancies per the inspection scheduled stated within the fire code.
PP5	The City utilizes NC state building code requirements to ensure adequate tie-down requirements for new installations and construction of accessory buildings greater than 144 square feet. The Building Inspections Division will provide information regarding anchoring and tie-down requirements to local suppliers.	All	Medium	Building Inspections	Local		Complete – The City utilizes the NC Building Code requirements to ensure adequate tie down
PP6	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	medium	Emergency Services, Facilities Maintenance	UHMA	2023	Deferred – Presently City Hall and all public safety related buildings (police and fire) are equipped with emergency backup generators. The City is in the process of outfitting Fire Station 3 with a more adequate emergency back-up power system. The City is presently analyzing all identified critical infrastructure to

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
							determine the need for additional emergency back-up power.
NATURAL RESOURCE ACTION							
NR1	The City revised the Flood Prevention Ordinance during September, 2005 to ban and/or remove existing companies with hazardous material/junkyards out of the floodplains.	Flood	Low	Development Services and Code Enforcement	Local		Complete - Modification of floodplain zones resulted in one salvage yard being removed from the floodplain. Other hazardous material/salvage yard occupancies that have been identified within floodplain zones have been documented as such and inspected as needed. The Flood Prevention Ordinance established in September 2005 disallows any development of such occupancies in the designated floodplains and prevents re-entry in the event of catastrophic damage. The City provides follow-up investigations on any potential violations. FY20, the city is planning to adopt an update to this ordinance.
EMERGENCY SERVICES							
ES1	Review, update and test the City Emergency Operations Plan.	All	Medium	All Departments	Local	Annual	Complete – The City reviews and tests the Emergency Operations Plan at least annually through drills and exercises.
ES2	The City will develop an evacuation strategy for hazardous material response. This is a project of the Public Safety Department and is currently under development	HAZMAT	Medium	Public Safety	Local	2023	Using lists of target hazards generated through fire code enforcement, pre-incident surveys, Tier II reporting, and the Onslow County Local Emergency Planning Committee, evacuation strategies will be developed and tested and reviewed annually with review of the Hazard Mitigation Plan.
ES3	The City will develop response scenarios for losses to water wells, water towers, wastewater pump stations, the land application site and other critical infrastructure as needed. This will be applied city-wide.	All	Medium	Public Services, Public Safety	Local	2023	The City has emergency response plans in place for much of the critical infrastructure. These plans shall be reviewed and updated periodically. The City is currently working to identify and prepare emergency response plans for infrastructure that does not have response plans. The response plan for the lagoons at the land application site is currently under review.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
							The chlorine response plan for the land application site was last reviewed in March 2014. The response plan for the City's Wastewater Main Pump Station and Force Main was last reviewed in 2012. Efforts are underway to create response plans for those facilities that are without such plans and all plans will be combined and located at City Hall and all Water/Wastewater administrative offices.
STRUCTRUAL							
S1	Maintain ditches along streets to facilitate drainage. This is a City-wide program managed by the Streets Division wherever swales provide street drainage; this program is ongoing and includes routine ditch clearing, street sweepings, and catch basin cleaning.	Flood, Hurricane	Low	Public Services	Local	2024	Deferred - The City has funded capital projects that are intended to improve storm water drainage in areas of the City where there is a significant history of flooding affecting multiple properties. Parkwood Area Stormwater project: improved the storm water drainage to a residential area, along with additional improvements to the water and sewer lines and some of the streets in the affected area.
PUBLIC INFORMATION							
PI1	City will deliver a citizen education program on water conservation to include distribution of free water conservation kits to City water customers.	Drought	Medium	Public Services	Local		Complete - The City provides citizen education through the water sewer advisory committee and through various outreach mediums.
PI2	Jacksonville will maintain documents about flood insurance, flood protection, flood plain management, and natural and beneficial functions of flood plains. Many documents are available free of charge from the Federal Emergency Management Agency (FEMA). This is work performed for the CRS program.	Flooding	Medium	CRS Coordinator	Local		Complete - The City reviews these documents on an annual basis and will continue with this process.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PI3	Provide flood-proofing information to those owners/residents living in repetitive loss structures	Flooding	Medium	Developmental Services, Code Inspections	Local		Complete. The City has held meetings with residents who have experienced repetitive flood loss.
PI4	Assist local real estate agents, insurance companies, banks and other lending institutions by notifying them of the availability of flood plain information.	Flooding	Low	The Community Rating System (CRS) Coordinator	Local		Complete - Information is available to local agencies via the City's website. Although it applies to areas adjacent to flood hazard areas, the information is available city-wide. The City also utilized mailers to listed firms.

North Topsail Beach Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	Remain current with all Community Rating System reporting requirements to ensure program compliance. Actively pursue activities that will lower our CRS rating.	Flood	Medium	Planning Department	Local		Deleted, capability maintained as part of CRS program.
P2	Request courtesy review by ISO/CRS Coordinator's to identify additional CRS credit activities.	Flood	Medium	Planning Department	Local		Deleted, capability maintained as part of CRS program.
P3	Pursue State and Federal grants to assist in the hazard mitigation recommendations included in the plan.	All	Medium	LEO, VFD	Local	2021-2026	Deferred, submitted 13 applications for elevation, 13 for acquisition. Pending final FEMA approval of 2 qualified acquisitions and 1 elevation. Will continue to develop applications as funding becomes available.
P4	Review, update and test the NTB Storm Preparedness Plan. Review with all departments.	All	High	All Departments	Local		Deleted, capability maintained as part of CRS program, will also be included in EOP.
P5	NTB will enforce storm water regulations established by the State and incorporate regulations in Zoning Ordinance.	Flood	High	Planning	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan and CAMA program.
P6	NTB has a Master Plan for the Town and will review and update the master plan on and yearly basis	Flood	Low	Planning	Local		Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
P7	The NTB CAMA Land Use Plan will require updating in the year 2015. The Town will work to establish new goals for addressing flooding in all areas of the Town and protection of all AEC's.	Flood	Medium	Planning	CAMA Grant, Local	2021	Deferred, pending Board of Aldermen approval.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
P8	The town will support and enforce State rules and guidelines for AEC located within the Town limits.	Flood	High	Planning	State Local		Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
P9	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing, anchoring fixed building equipment.	All	Medium	Buildings and Inspections, Planning Dept., Emergency Services	Local, State Grants, UHMA Grants, other federal grants	2021-2026	Deferred, seeking out grants to help address, planning to include in the refurbishment of town hall.
PROPERTY PROTECTION							
PP1	Make use of NTB flood plain, parcel data, and aerial photographs in digital format overlaid through Onslow County GIS.	Flood	High	Planning Department	Local		Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
PP2	NTB will encourage projects undertaken by the NTB PD, NTB FD, and the Public Works Dept that will lessen the vulnerability of the Town and its residents to natural hazards.	All	Medium	Town Manager	Local	2021-2026	Deferred, MOU with County for use of facility as an alternate EOC. MOU for mutual aid between NTBPD and Onslow Sheriff's Department.
PP3	Enforce tie-down requirements for LP tanks and above ground oil heating tanks.	Flood, Hurricane, Tornado	Medium	Planning	Local	Annual	Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
PP4	Require structures damaged more than 50% to be rebuilt in compliance with current standards in accordance with CAMA regulations and UDO Article 7 Flood Damage Prevention.	Flood, Hurricane	High	Planning/Building Inspections	Local	Annual	Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
PP5	Beach Nourishment Project: NTB will continue with the Federal Beach Nourishment Project.	All	High	All	Federal, Local	2021-2026	Deferred, attend monthly meetings of the Topsail Island Shoreline Protection Commission. Formal monthly reports are

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
							submitted to the Board of Aldermen and available to the public.
PP6	Restrict bulk fuel storage facilities in accordance with the CAMA Land Use Plan	Hurricane, Flood, Tornado	High	Zoning, CAMA/CRS Coordinator	Local		Deleted, capability maintained as part of Unified Development Ordinance and CAMA Land Use Plan.
PP7	Limit the amount of impervious surface allowed for each lot to minimize storm water runoff in accordance with the NTB Town Code and CAMA regulations.	Flood, Hurricane	High	Zoning, CAMA/CRS Coordinator	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan and CAMA regulations.
PP8	Prevent dune disturbances and restrict structures in the inlet hazard area to single-family dwellings only in accordance with the CAMA Land Use Plan.	Flood, Hurricane	High	Zoning, CAMA/CRS, Coordinator	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan and CAMA regulations.
PP9	Enforce a 48 foot height maximum for new structures in accordance with the UDO.	Flood, Hurricane	High	Zoning	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan.
PP10	Enforce the VE Zone Construction Standards in accordance with UDO Article 7 Flood Damage Prevention.	Flood, Hurricane	High	Zoning, Building Administrator	Local		Deleted, capability maintained as part of Unified Development Ordinance.
PP11	Enforce setback requirements for Ocean Hazard and Inlet Hazard Areas in accordance with CAMA regulations.	Flood, Hurricane	High	Zoning, CAMA/CRS Coordinator	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan and CAMA regulations.
PP12	Require a buffer area from the mean high water line in accordance with CAMA regulations	Flood, Hurricane	High	CAMA/CRS Coordinator	Local		Deleted, capability maintained as part of Unified Development Ordinance, CAMA Land Use Plan and CAMA regulations.
PP13	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	medium	Emergency Services, Facilities Maintenance	UHMA		Completed.
NATURAL RESOURCE ACTION							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
NR2	Support activities in the development of Army Corps of Engineers Federal Shoreline Protection Project	Flood/ Erosion	High	Town Manager	Federal, Local	2021-2026	Deferred, attend monthly meetings of the Topsail Island Shoreline Protection Commission. Formal monthly reports are submitted to the Board of Aldermen.
EMERGENCY SERVICES							
ES1	Maintain a map and list of streets that would be advised to evacuate in the event of a hurricane. At the appropriate time, Police and Fire will assist in the evacuation of those residents who are unable to leave on their own.	Flood	Medium	LEO, FD	Local		Deleted, capability maintained as part of the CRS program.
STRUCTURAL							
S1	Perform annual assessment town wide of ditches to ensure proper grading. Coordinate with NCDOT for repairs to ensure proper drainage.	Flood	Medium	NC DOT and NTB Public Works	Local		Deleted, capability maintained as part of Public Works ditch maintenance program and CRS program.
PUBLIC INFORMATION							
PI1	Work with the County to ensure implementation of a viable public education and outreach program for mitigation, preparedness, response, and recovery. Refer to the OC MJ-HMP for more information.	All	High	CRS Coordinator	Local		Deleted, capability maintained as part of CRS program.
PI2	Assist local real estate agents with information handouts that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing.	Flood	Medium	Planning Department, CRS Coordinator	Local		Deleted, capability maintained as part of CRS program.
PI3	Distribute flood protection flyers to all property owners in NTB through a community newsletter. The flyer should include a general identification of the local flood	Flood	Medium	Town Clerk	Local		Deleted, capability maintained as part of CRS program.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	hazard, flood safety, flood insurance, property protection, flood plain development permit requirements and drainage system.						
PI4	Send a public information letter to repetitive loss structures. Identify new losses and maintain repetitive loss database.	Flood	Low	Planning	Local		Deleted, capability maintained as part of CRS program.
PI5	Maintain Town web site providing all hazards information to include but not limited to: flooding, hurricanes, erosion, severe storms, etc.	All	Medium	CAMA/CRS Coordinator	Local		Deleted, capability maintained as part of CRS program.
PI6	Provide list of contractors skilled in retrofitting techniques.	All	Medium	Building Inspector	Local		Deleted, capability maintained as part of CRS program.
PI7	NTB will maintain flood insurance, flood protection, flood plain management, and natural and beneficial functions of flood plains. Many documents are located at Town Hall and Sneads Ferry Public Library; many Documents are from (FEMA).	Flood	Medium	Planning Department	Local		Deleted, capability maintained as part of CRS program.

Richlands Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	Richlands will actively pursue State and Federal grant funds to assist in the hazard mitigation recommendations included in the plan.	All Hazards	Medium	All Departments	UHMA Grants	2021-2026	Deferred: No active grants are currently being pursued.
P2	Richlands will encourage projects undertaken by the Richlands Police Dept, Richlands VFD, the Richlands Public Works Dept and ONWASA that will lessen the vulnerability of the Town and its residents to natural hazards.	All Hazards	Medium	All Departments	Local Staff Time and Labor	2021-2026	Deferred: As ideas come forth through networking, etc., they are evaluated, and either the project is undertaken or funding is sought. MOA signed with all Onslow County Law Enforcement agencies for mutual aid.
P3	Richlands will enforce the Flood Damage Prevention Ordinance, which does not permit new solid waste disposal facilities, salvage yards and chemical storage facilities to be located in Special Flood Hazard Areas. The Town Administrator will review applications for work in the floodplain to ensure compliance with the Flood Damage Prevention Ordinance.	Flood	Medium	Town Administrator	Local	2021-2026	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance and permits will be processed per the regulations when submitted.
P4	The Town will access the resources and data available at the Planning and Inspections Department of Onslow County relevant to the mitigation of natural hazards and meet with Onslow County annually to coordinate progress on Hazard Mitigation Plans.	All Hazards	Medium	Town Administrator	Local	2021	Deferred: Currently in process of updating the Southeastern NC Regional Mitigation Plan
P5	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use	All Hazards	Medium	Buildings and Inspections, Planning Dept.,	Local, State Grants, UHMA	2021	Completed: Installed a new 80 KW generator at town hall/police department to facilitate

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing, anchoring fixed building equipment.			Emergency Services	Grants, other federal grants		town emergency operations during hazardous events.
PROPERTY PROTECTION							
PP1	Richlands will evaluate the current building and development forms for evidence that they identify and address mitigation strategies.	All Hazards	Medium	Planning/ Zoning	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
PP2	Make use of Richlands flood plain, parcel data, and aerial photographs in digital format. Onslow County GIS will assist with this.	Flood	High	Planning/ Zoning	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance and Federally developed and approved FIRMS as part of the participation in the NFIP.
PP3	Richlands will ensure as new lift stations are installed the electrical panels will be located as required by the Town's Flood Damage Prevention Ordinance.	Flood	High	Town Administrator	Local	2021-2026	Deferred: No new lift stations are currently proposed within the Town jurisdiction.
PP4	Richlands will maintain tie-down requirements for LP tanks and aboveground heating oil tanks that are in the flood hazard areas.	Flood	Medium	Planning Department	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
PP5	Richlands will consider adding tie-down requirements for all sheds, garages, carports, etc., that do not have walls secured to the floor in a manner meeting the NC Building Code. This will be applied Town wide.	Tornado, Hurricane	Medium	Planning Department	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
PP6	The Town will utilize ordinances and land use controls to regulate	Flood	High	Planning/ Zoning	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	development within the floodplain and update them as necessary.						
PP7	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	medium	Emergency Services, Facilities Maintenance	UHMA	2021	Completed: A new 80 KW backup generator with automatic transfer switch is in the process of being installed at the town hall to town facilitate emergency operations.
NATURAL RESOURCE ACTION							
NR1	Richlands will maintain documents about flood insurance, flood protection, flood plain management, and natural and beneficial functions of flood plains.	Flood	Medium	Planning/ Zoning	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
NR2	Richlands will consider revising the Flood Prevention Ordinance to ban and/or remove existing companies with hazardous material/ junkyards out of the flood plains	Flood	Low	Planning/ Zoning	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
EMERGENCY SERVICES							
ES1	Review, update and maintain the Richlands Emergency Management Plan.	All Hazards	Medium	Town Administrator Board of Aldermen	Local	2021-2026	Deferred: The plan is reviewed annually. Changes are made as they are found necessary. No changes necessary during this period.
ES2	The Town will maintain a listing of streets that would serve as main evacuation routes in the event of a hurricane.	Hurricanes	High	LEO, VFD	Local	2021	Deleted: The primary evacuation routes out of Richlands are all part of the State Highway System, including Federal Aid Highway 258/24.
ES3	Richlands will address the roads on private property within the town limits that are unable to accommodate emergency vehicles through a public awareness campaign.	All Hazards	High	Town Administrator VFD	Local	2021	Completed: No roads required addressing.
ES4	Richlands will develop an evacuation strategy for hazardous material	HazMat	High	LEO, VFD, Onslow County EOC	Local	2021-2026	Deferred: To be established as part of the Town's Emergency Management Plan in

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	response which will be applied Town wide.						coordination with Onslow County Emergency Management Services.
STRUCTURAL							
S1	Perform annual assessment town wide of ditches to ensure proper grading. Perform repairs or coordinate with NCDOT for repairs to NCDOT roads.	Flood, Hurricane	High	Public Works	Local	2021-2026	Deferred: No ditches have required repair or grading during this period.
PUBLIC INFORMATION							
PI1	Richlands will develop, enhance, and implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses, and schools.	All Hazards	Medium	Town Administrator	Local Grants	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.
PI2	Richlands will provide flood protection information to all property owners in Richlands through the use of a quarterly newsletter, utility bill, website, maps or other available methods. The information should include links to local flood ordinances and regulatory maps provided by Federal and State flood mapping authorities.	Flood	Medium	Town Administrator, Town Clerk, Billing Clerk	Local	2021	Deleted: Capabilities are maintained by the adopted Flood Damage Prevention Ordinance in accordance with the NFIP.

Swansboro Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
				PREVENTION			
P1	Pursue state and Federal grant funds to assist in the hazard mitigation recommendations included in the plan	All	Medium	All Departments	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. Town will apply for assistance as grant funding is available for qualified projects. No applicable projects identified during this period.
P2	The mitigation strategies will be reviewed yearly to evaluate progress and identify new strategies	All	Medium	All Departments	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques.
P3	The Town will consider applying for the FEMA Community Rating System and pursue credit points through the program which could result in a reduction in insurance rates for citizens.	Flood	Medium	Planning Director	Local	2021-2022	Deferred due to current staff workload, lack of time.
P4	The Town will enforce the requirements of the Flood Damage Prevention Ordinance.	Flood	Medium	Planning Department	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques.
P5	Monitor all development sites to ensure storm water controls are in place and are maintained. Based on storm water permits.	Flood, Erosion	Medium	Planning Director/Public Works Department	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques.
P6	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, backup generators, ignition-resistant materials, 320 or 361 compliant safe rooms, lightning	All	Medium	Buildings and Inspections, Planning Dept., Emergency Services	Local, State Grants, UHMA Grants, other federal grants	2020-2026	NEW

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	protection, hail resistant roofing, anchoring fixed building equipment.						
PROPERTY PROTECTION							
PP1	Swansboro will encourage projects undertaken by the Swansboro Public Safety Department, Public Works Department, Parks and Recreation Department, and ONWASA that will lessen the vulnerability of the Town and its residents to natural hazards	All Hazards	Medium	All Departments	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. As ideas come forth through networking, etc., they are evaluated, and either the project is undertaken or funding is sought. MOU for mutual aid between Swansboro PD and all law enforcement agencies in Onslow County.
PP2	Swansboro will make use of floodplain, parcel data, and aerial photographs in digital format. The Town relies on Onslow County GIS, FEMA, and NC Emergency Management to furnish these data.	Flood	Medium	Planning Department	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. Map data is reviewed for accuracy and completeness and is updated annually with the Onslow County GIS Department. Information is made publicly available via the Onslow County website.
PP3	Swansboro will ensure as new lift stations are installed the electrical panels are located above the base flood elevation.	Flood	High	Planning Director/Building Inspector/ONWASA	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. No new lift stations installed during this period. 3 existing lift stations had modification made to provide flood protection.
PP4	Swansboro will maintain tie-down requirements for LP tanks and above ground heating oil tanks that are in flood hazard areas.	Flood	High	Building Inspector	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. 272 permits issued enforcing this action.
PP5	Swansboro will require the addition of tie-downs for all sheds, garages, carports, etc., that do not have walls secured to the floor in a	Flood	High	Building Inspector	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	manner meeting the NC Building Code.						64 permits issued enforcing this action.
PP6	Install backup generators with automatic transfer switches and/or transfer switches for mobile generators on all critical facilities and critical utilities.	All	medium	Emergency Services	UHMA	2020	Completed
EMERGENCY SERVICES							
ES1	Swansboro will develop a Comprehensive Emergency Management Plan	All Hazards	High	Public Safety Department	Local	2020-2021	NEW
ES2	The Town will maintain a listing of streets that would serve as main evacuation routes in the event of a hurricane. This is a part of the Town's Storm Preparedness Plan, which is updated annually.	Hurricane	High	Public Safety	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. Reviewed and updated on an annual basis in conjunction with the annual review of the Storm Preparedness Plan. No new changes noted.
ES3	Swansboro will monitor the roads on private property within the town limits to ensure they can accommodate emergency vehicles through a routine inspection program.	All Hazards	High	Public Safety	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. Reviewed on an annual basis. No roads required addressing.
ES4	Swansboro will develop an evacuation strategy for hazardous material response which will be applied Town wide.	HazMat	High	Public Safety	Local	2020-2021	NEW - To be established as part of the Comprehensive Emergency Management Plan. After initial adoption, reviewed annually. Will become part of the CEMP (ES1)
STRUCTURAL PROJECTS							
S1	Perform annual assessment town wide of ditches to ensure proper grading. Perform repairs or coordinate with NCDOT for repairs to NCDOT roads.	Flood	High	Public Works	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
							The Public Works Director will review the Town's infrastructure to ensure proper drainage to prevent flooding. Monthly inspections. No ditches have required regarding this period
PUBLIC INFORMATION							
PI1	Swansboro will provide assistance to citizens in obtaining documents about flood insurance, flood protection, floodplain management, and the natural and beneficial functions of floodplains. Many documents are available free of charge from the Federal Emergency Management Agency (FEMA).	Flood	Medium	Planning Department	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. A reference library will be established where citizens will have access to these types of materials. Periodically information will also be provided in the quarterly newsletter. Have obtained brochures. Working on developing a public display area. Information also provided at least annually in the quarterly newsletter town-wide.
PI2	Swansboro will send a flood information article once a year to all in-town property owners in Swansboro through the quarterly newsletter. The information article should include general identification of flood hazards, and include information on flood safety, flood insurance, property protection, etc.	Flood	Medium	Planning Department	Local	2020-2026	Deferred: Annual distribution through quarterly newsletter. Newsletter contains NFIP information at least once annually and is mailed out to all property owners within the town limits.
PI3	Swansboro will develop, enhance, and implement education programs aimed at mitigating natural hazards and reducing the risk to citizens, public agencies, private property owners, businesses, and schools	All	High	Planning Director **Public Safety	Local		Deleted: This is a day to day activity for the Town and will be discussed as part its capability to implement mitigation techniques. Annual review of programs during the budget process beginning in March. Held workshop on floodplain that included guest speakers from State offices.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PI4	Swansboro will notify property owners within the newly created Coastal A/LIMWA zone of the implications and permitting requirements	Flood	Medium	Planning Director	Local	2020	NEW
PI5	Map and identify stormwater infrastructure that needs upsizing or replacement. Incorporate into CIP	Flood	Medium	Public Works	Local	2021-22	NEW
PI6	Adopt an ordinance amendment to require critical infrastructure and major public facilities to be located outside of the 500-year floodplain	Flood	Medium	Planning Director	Local	2021	NEW
PI7	Adopt an ordinance amendment to require a 2-3 freeboard	Flood	Medium	Planning Director	Local	2020	NEW
PI8	Develop incentives for utilization of low impact development (LID) techniques	Flood	Medium	Planning Director/Public Works/Finance	Local/State	2021	NEW
PI9	Incorporate the identified Conservation Priority Areas into the zoning map and develop ordinance requirements to locate development outside of these areas	Flood	Medium	Planning Director	Local	2021	NEW

Pender County Mitigation Action Plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PC1	In concert with the American Red Cross (ARC), maintain a continuously updated list of all dedicated shelter facilities.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations, American Red Cross	GF, NCDPS, ARC	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: N/A Topsail Beach: See update provided by County. Watha: See update provided by County.
PC2	Maintain continuous contact/working relationship with electric service providers in the County to address the following (1) disaster preparedness techniques (e.g., tree trimming, vegetation planting requirements, pole replacement), (2) Identify critical electrical facilities needing retrofit or upgrade and map with elevation reference marks and, (3) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power. Meet at least once per year with electric service providers in preparation for hurricane season.	Thunder-storm, Hurricane	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Electric Service Providers	GF, Electric Service Providers	2026	Pender County: 1) Completed; 2) deferred, lack of resources; 3) completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: N/A Topsail Beach: See update provided by County. Watha: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PC3	Expand availability and improve effectiveness of all secondary power sources at all County and Municipal critical facilities.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations	GF, NCDPS	2026	Pender County: Deferred – lack of funding. Still pursuing funding alternatives. Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deferred – one town facility is still without secondary power source Topsail Beach: See update provided by County. Watha: See update provided by County.
PC4	Support the establishment of conservation easements on all floodprone property and impose such easements on all properties acquired with public assistance funds. The county will assist municipalities in working through this process.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Municipal Administrations	GF, PDM, HMGP, UHMA	2026	Pender County: Completed and ongoing. Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete/Ongoing Topsail Beach: See update provided by County. Watha: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PC5	Conduct an annual review of development restrictions in floodplain areas and maintain initiatives to ensure limited residential and commercial development in the floodplains and protection of critical facilities. This effort should include a review of county and municipal zoning, subdivision, and flood damage prevention regulations.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Municipal Administrations	GF	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete/Ongoing Topsail Beach: See update provided by County. Watha: See update provided by County.
PC6	Maintain all properties acquired through HMGP funding or other sources aimed at addressing natural hazard mitigation as open space in perpetuity.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Municipal Administrations	GF	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – handled by County Topsail Beach: See update provided by County. Watha: See update provided by County.
PC7	Adopt and annually update capital improvements plans at the county and municipal level with an emphasis on	All	Moderate	Pender County, Atkinson, Burgaw, St.	Pender County Emergency Management	GF	2026	Pender County: The County has a Capital Improvements Plan that is regularly reviewed and

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
	mitigation for critical facilities including relocation and retrofitting.			Helena, Surf City, Topsail Beach, Watha	Municipal Administrations			updated to consider mitigation of vulnerable critical facilities. Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – Town Hall and Police Department are relocating to new structures on the mainland Topsail Beach: See update provided by County. Watha: See update provided by County.
PC8	At the staff level, work with the NCDOT to identify and develop resolutions for local and regional drainage issues created by NCDOT facilities, including inspections of channels, retention basins, and, as needed, pursue debris removal.	Flood	Moderate	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Municipal Administrations NCDOT	GF, NCDOT	2026	Pender County: Deferred – lack of staff and resources Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed/Ongoing – activity that occurs as daily business is conducted Topsail Beach: See update provided by County. Watha: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
PC9	Apply for all available funding from the Hazard Mitigation Grant Program (HMGP) and funds to assist with the mitigation of severe repetitive loss properties to relocate structures out of the floodplain.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Municipal Administrations	GF, PDM, HMGP, UHMA	2026	Pender County: Completed and ongoing. Most recently the County applied for HMGP funding under Hurricane Florence Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – Handled by the County Topsail Beach: See update provided by County. Watha: See update provided by County.
PC10	Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA) within both incorporated and unincorporated portions of the County. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined special flood hazard area without the submittal of the required elevation certificate	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Pender County Planning Municipal Administrations	GF	2026	Pender County: Completed for unincorporated Pender County Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – town required a FEC prior to CO issuance Topsail Beach: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Watha: See update provided by County.
PC11	Continue to comply with NC State Coastal stormwater regulations.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Pender County Planning Municipal Administrations	GF, NCDEQ	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – town has completed, and will continue to comply with all stormwater regs Topsail Beach: See update provided by County. Watha: See update provided by County.
PC12	Continuously maintain tax parcel information for all properties located throughout the county.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County GIS	GF	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: N/A Topsail Beach: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Watha: See update provided by County.
PC13	Maintain a map information service involving the following: (1) Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including providing information on whether a given property is located within a flood hazard area, (2) Provide information regarding the flood insurance purchase requirement on the county's website, (3) Maintain historical and current FIRM's, (4) Locally advertise annually in the local newspaper, (5) Provide information to inquirers about local floodplain management requirements, (6) Include in the county's newsletter (all property owners) and on the county's website a letter on flood insurance, (7) Notify property owners within a floodprone area that they are subject to flooding.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning, Pender County Emergency Management Pender County Administration, Municipal Administrations	GF, FEMA	2026	Pender County: Completed annually Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – town does all except (4) and (as they are not applicable6) Topsail Beach: See update provided by County. Watha: See update provided by County.
PC14	Make information regarding hazards and development regulations within the floodplains available through the following: (1) The County Planning Director will ensure that the local library maintains information relating to flooding and flood protection, (2) The County will provide a link on their website to FEMA resources addressing flooding and flood protection, and (3) materials will be made available at municipal administration buildings.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning, Pender County Emergency Management Pender County Administration, Municipal Administrations	GF, FEMA	2026	Pender County: Completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – materials are readily available in print and in digital formats Topsail Beach: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Watha: See update provided by County.
PC15	Provide comprehensive services regarding planning and development activities within the defined SFHA. These services will include (1) Providing site specific flood and flood-related information on an as needed basis, (2) Building inspections department will maintain a list of contractors with experience in floodproofing and retrofit techniques, (3) Building inspections department will maintain materials providing an overview of how to select a qualified contractor, (4) Make site visits upon request to review occurrences of flooding, drainage, and sewer problems--if applicable, inspector should provide one-on-one advice to the property owner, (5) Provide advice and assistance regarding CRS Activity 530, (6) Advertise the availability of services annually within the local newspaper, and (7) Maintain a log of all individuals assisted through these services, including site visits.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Pender County Administration Municipal Administrations	GF, FEMA	2026	Pender County: Completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete – Except (5), (6) and (7) as they are not applicable. Topsail Beach: See update provided by County. Watha: See update provided by County.
PC16	Work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The County will provide these agencies with brochures documenting the concerns relating to development located within flood prone areas.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Pender County Administration Municipal Administrations	GF	2026	Pender County: Completed annually Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete – documents are available both in print and digital form.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Topsail Beach: See update provided by County. Watha: See update provided by County.
PC17	Coordinate with the Pender County School System Hazards Awareness Educational Programs to be presented by Public Safety personnel.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management	GF	2026	Pender County: Deferred – lack of staffing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: N/A Topsail Beach: See update provided by County. Watha: See update provided by County.
PC18	Post educational information on the County's website addressing the hazards associated with wildfires, hail, tsunamis, tornados, hurricanes, flooding, and storm surge, as well as other hazards outlined in Section 3 of this plan.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations	GF	2026	Pender County: Completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete – Instituted a dedicated webpage within the town's Department of Emergency management site: Surfcity.gov/em Topsail Beach: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Watha: See update provided by County.
PC19	Continue to rely on the Pender County Emergency Operations Plan (EOP) for effective disaster event communication. These efforts should include exercises to ensure that all municipalities are engaged and aware of their role in the emergency response process.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations	GF, NCDPS	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – TOSC has developed an organic EOP that will be utilized as the legal guiding doctrine. *Note – The town's EOP is interoperable with the County's EOP. Topsail Beach: See update provided by County. Watha: See update provided by County.
PC20	Maintain a registry of special medical needs individuals who has been coordinated with the Pender County Department of Social Services. This list will include: (1) Persons on life support systems, (2) Persons dependent on electricity for medical equipment, and (3) Persons with severe mental handicap or mental illness. Coordinate with current county system and local plans. Connect with county CTY (Call Back Program).	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Social Services Municipal Administrations	GF, NCDPS	2026	Pender County: Completed and ongoing. To be updated before the number hm plan update in 2026. Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Surf City: Completed – worked with Pender County DSSS on outreach activities. Linked special needs registry programs on the Town's EM webpage. Topsail Beach: See update provided by County. Watha: See update provided by County.
PC21	Work on the five-year implementation of this plan. At the end of this five year period, the county will undertake efforts to update this plan including the following ten planning steps: (1) Organize to prepare the plan, (2) Involve the public, (3) Coordinate with other agencies, (4) Assess the hazard, (5) Assess the problem, (6) Set goals, (7) Review possible activities, (8) Draft an action plan, (9) Adopt the plan, and (10) Implement, evaluate, and revise.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Municipal Administrations	GF, PDM, HMGP	2026	Pender County: Completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete Topsail Beach: See update provided by County. Watha: See update provided by County.
PC22	Continue to enforce the International Building Code, to include requiring that new structures or structures undergoing significant renovation (renovations or expansion exceeding 50% of fair market value) meet code requirements for coastal and noncoastal areas.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Planning Municipal Administrations	GF	2026	Pender County: Completed Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Complete – the Town continues to enforce the NCBC.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Topsail Beach: See update provided by County. Watha: See update provided by County.
PC23	Continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state. The county will rely on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Municipal Administrations	GF	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – not applicable to the Town. Topsail Beach: See update provided by County. Watha: See update provided by County.
PC24	Request Hazard Mitigation Assistance (HMA) funding for the elevation/floodproofing of repetitive loss properties.	Flood	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations	GF, PDM, HMGP, UHMA	2026	Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – Coordinated through Pender County

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Topsail Beach: See update provided by County. Watha: See update provided by County.
PC25	Request Hazard Mitigation Assistance (HMA) funding for windproofing of critical facilities.	Hurricane	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Emergency Management Municipal Administrations	GF, PDM, HMGP, UHMA		Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – Coordinated through Pender County Topsail Beach: See update provided by County. Watha: See update provided by County.
PC26	Continue to maintain state approved water supply plans in municipalities operating central water service.	All	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Public Works Municipal Administrations	GF, NCDEQ		Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Completed – the Town continues to maintain water supply plans

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Topsail Beach: See update provided by County. Watha: See update provided by County.
PC27	Continue to enforce and adopt water shortage response plans and water shortage ordinances for municipalities operating central water service.	Drought	High	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Public Works Municipal Administrations	GF, NCDEQ		Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deferred – Refinement of water shortage plans underway. Topsail Beach: See update provided by County. Watha: See update provided by County.
PC28	Continue to seek funding sources for the elevation or retrofitting of existing sewer lift stations in an effort to reduce or eliminate the impacts from flooding.	Flood	Moderate	Pender County, Atkinson, Burgaw, St. Helena, Surf City, Topsail Beach, Watha	Pender County Administration Municipal Administrations	GF, PDM, HMGP, UHMA		Pender County: Completed and ongoing Atkinson: See update provided by County. Burgaw: See update provided by County. St. Helena: See update provided by County. Surf City: Deleted – not a feasible option for the Town to implement.

Action #	Description	Hazard(s) Addressed	Relative Priority	Applicable Jurisdictions	Lead Agency/Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2021)
								Topsail Beach: See update provided by County. Watha: See update provided by County.
PC29	Join and continue seeking classification improvements within the Community Rating System	Flood	Moderate	Pender County	Pender County Planning	General Fund	2021	New Action for the 2021 Update
PC30	Consider developing innovate approaches to floodplain management including density tradeoffs, cluster development regulations, and additional opportunities for land donation and dedication.	Flood, Hurricanes	High	Pender County	Pender County Planning	General Fund	Continuous, 2026	New Action for the 2021 Update
PC31	Continue to encourage, and where warranted require, National Incident Management System (NIMS) training for county personnel which includes ICS 100, ICS 200, ICS 300, ICS 400, IS 700, and IS 800.	All	High	Pender County	Pender County Planning	General Fund	Continuous, 2026	New Action for the 2021 Update
PC32	Explore ways to create linkage between the Pender 2.0 Comprehensive Land Use Plan and hazard mitigation through the Emergency Management Department.	Flood, Hurricanes	High	Pender County	Pender County Planning and Pender County Emergency Management	General Fund	Continuous, 2026	New Action for the 2021 Update
PC 33	Consider the data and recommendations outlined in this plan when preparing updates to Capital Improvements Plans. All recommendations regarding capital expenditures will focus on siting all infrastructure and public facilities outside of the Flood Hazard Area.	Floods, Hurricanes	High	Pender County	Facilities	General Fund	Ongoing through 2026	New Action for the 2021 Update
PC 34	Work with NC Office of Recovery and Resilience (NCORR) to identify homes in flood prone areas for potential funding through CDBG programs for mitigation and disaster recovery.	Floods	High	Pender County	Pender County, NCORR	CDBG	Ongoing through 2026	New Action for the 2021 Update

SECTION 10

PLAN MAINTENANCE PROCEDURES

44 CFR Requirement
44 CFR Part201.6(c)(4)(i): The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle. ***44 CFR Part 201.6(c)(4)(ii):*** The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

This section discusses how the Southeastern NC Region Mitigation Strategy and Mitigation Action Plan will be implemented and how the Regional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in a sustained hazard mitigation planning process. It consists of the following four subsections:

- 10.1 Implementation and Integration
- 10.2 Monitoring, Evaluation and Enhancement
- 10.3 Continued Public Involvement
- 10.4 Evaluation of Monitoring, Evaluation and Update Process

10.1 IMPLEMENTATION AND INTEGRATION

Each agency, department or other partner participating under the Southeastern NC Regional Hazard Mitigation Plan is responsible for implementing specific mitigation actions as prescribed in the Mitigation Action Plan. Every proposed action listed in the Mitigation Action Plan is assigned to a specific "lead" agency or department in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. In most cases, the counties in the Southeastern NC Region will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant City and County government decision-making processes or mechanisms, where feasible. This includes integrating the requirements of the Hazard Mitigation Plan into other local planning documents, processes or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the Southeastern NC Regional Mitigation Planning Committee will remain charged with ensuring that the goals and mitigation actions of new and updated local planning documents for their agencies or departments are consistent, or do not conflict with, the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the Southeastern NC Region.

Since the initial plan was adopted in 2015 for Brunswick, New Hanover and Pender County, and since Onslow County last adopted their plan, each County and participating jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable/feasible. Examples of how this integration has occurred have been documented in the Implementation Status discussion provided for each of the mitigation actions found in Section 9. Specific examples of how integration has occurred include:

- Integrating the mitigation plan into reviews and updates of floodplain management ordinances
- Integrating the mitigation plan into reviews and updates of County emergency operations plans
- Integrating the mitigation plan into review and updates of building codes
- Integrating the mitigation plan into the capital improvements plan through identification of mitigation actions that require local funding.

Opportunities to further integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the Regional Mitigation Planning Committee, individual county meetings, and the annual review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Regional Hazard Mitigation Plan is deemed by the Southeastern NC Regional Mitigation Planning Committee to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

10.2 MONITORING, EVALUATION, AND ENHANCEMENT

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan.

When determined necessary, the Southeastern NC Regional Mitigation Planning Committee shall meet in March of every year to evaluate and monitor the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the Regional Mitigation Planning Committee shall be documented in the form of a report that can be shared with interested Community and County Council members. The Regional Mitigation Planning Committee will also meet following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed for future implementation. This will ensure that the Plan is continuously updated to reflect changing conditions and needs within the Southeastern NC Region. For future updates of the plan, North Carolina Emergency Management's Hazard Mitigation Planning Section will help coordinate the reconvening of the Regional Mitigation Planning Committee for these reviews through coordination with each County's

Emergency Management Departments. Unless it is determined otherwise, the Emergency Management Director from Brunswick, New Hanover, Onslow and Pender Counties will maintain ultimate responsibility for their respective County's plan implementation and monitoring, evaluation and update.

Five (5) Year Plan Review

The Plan will be thoroughly reviewed by the Regional Mitigation Planning Committee every five years to determine whether there have been any significant changes in the Southeastern NC Region that may, in turn, necessitate changes in the types of mitigation actions proposed. In order to track progress and update the mitigation strategies identified in the plan, the Regional Mitigation Planning Committee anticipates they will revisit this plan on an annual basis and after a hazard event. New development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the Plan.

The plan review provides participating jurisdiction officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. North Carolina Emergency Management's Hazard Mitigation Planning section will help coordinate the reconvening the Regional Mitigation Planning Committee and conducting the five-year review through coordination with each County's Emergency Management Departments.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did County departments participate in the plan implementation process as assigned?

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process, the Southeastern NC Regional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at the North Carolina Division of Emergency Management (NCEM) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Disaster Declaration

Following a disaster declaration, the Southeastern NC Regional Hazard Mitigation Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility North Carolina Emergency Management's Hazard Mitigation Planning section to coordinate the reconvening of the Regional Mitigation Planning Committee, through coordination with each County's Emergency Management Department, and ensure the appropriate

stakeholders are invited to participate in the plan revision and update process following declared disaster events.

Reporting Procedures

The results of the five-year review will be summarized by the Regional Mitigation Planning Committee in a report that will include an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Plan Amendment Process

Upon the initiation of the amendment process, representatives from Brunswick, New Hanover, Onslow and Pender counties will forward information on the proposed change(s) to all interested parties including, but not limited to, all directly affected County departments, residents, and businesses. Information will also be forwarded to the North Carolina Division of Emergency Management. This information will be disseminated in order to seek input on the proposed amendment(s) for no less than a 45-day review and comment period.

At the end of the 45-day review and comment period, the proposed amendment(s) and all comments will be forwarded to the Regional Mitigation Planning Committee for final consideration. The Regional Mitigation Planning Committee will review the proposed amendment along with the comments received from other parties, and if acceptable, the committee will submit a recommendation for the approval and adoption of changes to the Plan.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered by the Regional Mitigation Planning Committee:

- There are errors, inaccuracies or omissions made in the identification of issues or needs in the Plan
- New issues or needs have been identified which are not adequately addressed in the Plan
- There has been a change in information, data, or assumptions from those on which the Plan is based

Upon receiving the recommendation from the Regional Mitigation Planning Committee and prior to adoption of the Plan, the participating jurisdictions will hold a public hearing, if deemed necessary. The governing bodies of each participating jurisdiction will review the recommendation from the Regional Mitigation Planning Committee (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the governing bodies will take one of the following actions:

- Adopt the proposed amendments as presented
- Adopt the proposed amendments with modifications
- Refer the amendments request back to the Regional Mitigation Planning Committee for further revision, or
- Defer the amendment request back to the Regional Mitigation Planning Committee for further consideration and/or additional hearings

10.3 CONTINUED PUBLIC INVOLVEMENT

44 CFR Requirement
44 CFR Part 201.6(c)(4)(iii): The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process

Public participation is an integral component to the mitigation planning process and will continue to be essential as this Plan evolves over time. As described above, significant changes or amendments to the Plan shall require a public hearing prior to any adoption procedures.

Other efforts to involve the public in the maintenance, evaluation and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Regional Mitigation Planning Committee in local newspapers, public bulletin boards and/or County office buildings
- Designating willing and voluntary citizens and private sector representatives as official members of the Regional Mitigation Planning Committee
- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place
- Utilizing the Brunswick, New Hanover, Onslow and Pender county websites to advertise any maintenance and/or periodic review activities taking place, and
- Keeping copies of the Plan in public libraries.

10.4 EVALUATION OF PREVIOUS MONITORING, EVALUATION AND UPDATE PROCESS

Over the past five years, the participating jurisdictions have been independently implementing, monitoring and evaluating their own mitigation action plans. Progress made in implementing actions has been documented in Section 9: Mitigation Action Plan where each action contains a narrative about the implementation status of the action as of 2021. That said, the jurisdiction did waiver slightly from the monitoring and evaluation process defined in the original version of the plan, but still made significant process in implementing their mitigation action plans. During the 2021 update of this plan, the Regional Mitigation Planning Committee determined that the procedures for the upcoming five-year monitoring and evaluation process will remain as defined above, with minor revisions as noted, and will be re-evaluated during the next plan update process.

The five-year comprehensive update process began as early as 2018 when North Carolina Emergency Management made the decision to set aside HMGP funding from Hurricane Matthew to fund the Southeastern NC Regional Hazard Mitigation Plan. To facilitate this effort, NCEM assigned the plan update to their pre-qualified hazard mitigation planning consultants ESP Associates. Representatives from ESP Associates first reached out to Brunswick, New Hanover, Onslow and Pender County representatives in July 2019 to initiate the plan update process. More details about the plan update process are provided in Section 2, Planning Process.

For the next update of this plan, NCEM's Hazard Mitigation Planning section will continue take the lead on organizing and initiating the 5-year update of the plan.

Appendix A
Plan Adoption

44 CFR Requirement
44 CFR Part 201.6(c)(5): The plan shall include documentation that the plan has been formally adopted by the local governing body of the jurisdiction requesting approval of the plan.

This section of the Plan includes a copy of the local adoption resolution passed by the participating jurisdictions in the Southeastern NC Region.

Appendix B
Planning Tools

This section of the Plan includes three (3) items:

1. A Blank Hazard Mitigation Public Survey
2. A Blank Capability Assessment Survey
3. Scoring Criteria for the Capability Assessment

PUBLIC SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help!

Brunswick, New Hanover, Onslow, and Pender Counties are currently engaged in a planning process to become less vulnerable to natural disasters, and your participation is important to us!

These four counties, along with participating local jurisdictions and other participating partners, are now working to update the region's multi-jurisdictional *Hazard Mitigation Plan*. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the four-county region.

This survey questionnaire provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impact of future hazard events.

Please help us by completing this survey and returning it to:

Nathan Slaughter, ESP Associates, Inc.
2200 Gateway Centre Blvd – Suite 216
Morrisville, NC 27560

Surveys can also be emailed to nslaughter@espassociates.com

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the *Southeastern NC Regional Hazard Mitigation Plan*, please contact ESP Associates, Inc, planning consultant for the project. You may reach Nathan Slaughter at 919.415.2726 or at the email address above.

This survey is also available online at:
https://s.surveyplanet.com/HOFD76fsq

1. Where do you live?

- ❑ Unincorporated Brunswick County
- ❑ Unincorporated New Hanover County
- ❑ Unincorporated Onslow County
- ❑ Unincorporated Pender County
- ❑ Atkinson
- ❑ Bald Head Island
- ❑ Belville
- ❑ Boiling Spring Lakes
- ❑ Bolivia
- ❑ Burgaw
- ❑ Calabash
- ❑ Carolina Beach
- ❑ Carolina Shores
- ❑ Caswell Beach
- ❑ Holden Beach
- ❑ Holly Ridge
- ❑ Holly Ridge
- ❑ Jacksonville
- ❑ Kure Beach
- ❑ Leland
- ❑ Navassa
- ❑ North Topsail Beach
- ❑ Northwest
- ❑ Oak Island
- ❑ Ocean Isle Beach
- ❑ Richlands
- ❑ Sandy Creek
- ❑ Shallotte
- ❑ Southport
- ❑ St. James
- ❑ Sunset Beach
- ❑ St. Helena
- ❑ Surf City
- ❑ Swansboro
- ❑ Topsail Beach
- ❑ Varnamtown
- ❑ Watha
- ❑ Wilmington
- ❑ Wrightsville Beach
- ❑ Other: _____

2. **Have you ever experienced or been impacted by a disaster?**

- ❑ Yes
- ❑ No

a. If "Yes," please explain:

3. **How concerned are you about the possibility of our community being impacted by a disaster?**

- ❑ Extremely concerned
- ❑ Somewhat concerned
- ❑ Not concerned

4. **Please select the <u>one</u> hazard you think is the *highest threat* to your neighborhood:**

- ❑ Cyber Attack
- ❑ Drought
- ❑ Electromagnetic Pulse (EMP)
- ❑ Excessive Heat
- ❑ Hazardous Substances
- ❑ Infectious Disease
- ❑ Lightning
- ❑ Severe Thunderstorms/High Wind
- ❑ Earthquakes
- ❑ Erosion
- ❑ Flooding
- ❑ Hurricane and Coastal Hazards
- ❑ Landslides
- ❑ Radiological Emergency
- ❑ Severe Winter Weather
- ❑ Terrorism
- ❑ Tornadoes
- ❑ Dam Failure
- ❑ Wildfire

5. **Please select the <u>one</u> hazard you think is the *second highest threat* to your neighborhood:**

- ❑ Cyber Attack
- ❑ Drought
- ❑ Electromagnetic Pulse (EMP)
- ❑ Excessive Heat
- ❑ Hazardous Substances
- ❑ Infectious Disease
- ❑ Lightning
- ❑ Severe Thunderstorms/High Wind
- ❑ Earthquakes
- ❑ Erosion
- ❑ Flooding
- ❑ Hurricane and Coastal Hazards
- ❑ Landslides
- ❑ Radiological Emergency
- ❑ Severe Winter Weather
- ❑ Terrorism
- ❑ Tornadoes
- ❑ Dam Failure
- ❑ Wildfire

6. **Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?**

- ❑ Yes (please explain): _____
- ❑ No

6. Is your home located in a floodplain?

- ❑ Yes
- ❑ No
- ❑ I'm not sure

7. **Do you have flood insurance?**

- ❑ Yes
- ❑ No
- ❑ I'm not sure

a. If "No," why not?

- ❑ Not located in floodplain
- ❑ Too expensive
- ❑ Not necessary because it never floods
- ❑ Not necessary because I'm elevated or otherwise protected
- ❑ Never really considered it
- ❑ Other (please explain): _____

8. **Have you taken any actions to make your home or neighborhood more resistant to hazards?**

- ❑ Yes
- ❑ No

b. If "Yes," please explain:

9. **Are you interested in making your home or neighborhood more resistant to hazards?**

- ❑ Yes
- ❑ No

10. Do you know what office to contact regarding reducing your risks to hazards in your area?

- ❑ Yes
- ❑ No

11. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?

- ❑ Newspaper
- ❑ Television
- ❑ Radio
- ❑ Internet
- ❑ Mail
- ❑ Public workshops/meetings
- ❑ School meetings
- ❑ Other (please explain): _____

12. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

13. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

14. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.

Category	Very Important	Somewhat Important	Not Important
1. Prevention Rules that frame the way the community grows. This includes administrative or regulatory actions around land development and building. Examples of these types of rules include zoning, building codes, open space preservation or conservation and floodplain regulations.	❑	❑	❑
2. Property Protection Changing existing buildings or removing buildings to prevent hazards from damaging them. Examples include buyouts, relocation, elevation (to protect from floods), making buildings stronger and adding things like storm shutters.	❑	❑	❑
3. Natural Resource Protection Preserving areas, or restoring areas to original habitat to perform natural functions. This can be done in addition to minimizing hazard losses. Examples include habitat preservation, slope stabilization and forest management.	❑	❑	❑
4. Structural Projects Projects that lessen the impact of a hazard by changing the natural progression of the hazard. Examples include dams, levees, retention ponds, retaining walls and storm sewers.	❑	❑	❑
5. Emergency Services Actions that protect people and/or protect property during and immediately after a hazard event. Examples include planning for evacuation, warning systems or protecting or reinforcing emergency facilities or systems.	❑	❑	❑
6. Public Education and Awareness Actions that inform people about hazards and how they can protect themselves, their family and their property. Examples include outreach/media campaigns, school education programs, written materials and special events.	❑	❑	❑

THANK YOU FOR YOUR PARTICIPATION!

This survey may be submitted anonymously; however, if you provide us with your name and contact information below we will have the ability to follow up with you to learn more about your ideas or concerns (optional):

Name: _____

Address: _____

_____

Phone: _____ **E-Mail:** _____

Local Capability Assessment Survey

Jurisdiction/Agency: _____ **Phone:** _____

Point of Contact: _____ **E-mail:** _____

1. PLANNING AND REGULATORY CAPABILITY - Please indicate whether the following planning or regulatory tools (plans, ordinances, codes or programs) are currently in place or under development for your jurisdiction by placing an "**X**" in the appropriate box. Then, for each particular item in place, identify the department or agency responsible for its implementation and indicate its estimated or anticipated effect on hazard loss reduction (Strongly Supports, Helps Facilitate or Hinders) with another "**X**". Finally, please provide additional comments or explanations in the space provided or with attachments.

Planning / Regulatory Tool	In Place	Under Development	Department / Agency Responsible	Effect on Loss Reduction			Comments
				Strongly Supports	Helps Facilitate	Hinders	
Hazard Mitigation Plan							
Comprehensive Land Use Plan (or General, Master or Growth Mgt. Plan)							
Floodplain Management Plan							
Open Space Management Plan (or Parks & Rec./ Greenways Plan)							
Stormwater Management Plan / Ordinance							
Natural Resource Protection Plan							
Flood Response Plan							
Emergency Operations Plan							
Continuity of Operations Plan							
Evacuation Plan							
Other Plans (please explain under Comments)							

Local Capability Assessment Survey

Planning / Regulatory Tool	In Place	Under Development	Department / Agency Responsible	Effect on Loss Reduction			Comments
				Strongly Supports	Facilitates	Hinders	
Disaster Recovery Plan							
Capital Improvements Plan							
Economic Development Plan							
Historic Preservation Plan							
Floodplain Ordinance (or Flood Damage Prevention Ordinance)							
Zoning Ordinance							
Subdivision Ordinance							
Unified Development Ordinance							
Post-disaster Redevelopment / Reconstruction Ordinance							
Building Code							
Fire Code							
National Flood Insurance Program (NFIP)							
NFIP Community Rating System (CRS Program)							

Local Capability Assessment Survey

2. ADMINISTRATIVE AND TECHNICAL CAPABILITY - Please indicate whether your jurisdiction maintains the following staff members within its current personnel resources by placing an "**X**" in the appropriate box . Then, if YES, please identify the department or agency they work under and provide any other comments you may have in the space provided or with attachments.

Staff / Personnel Resources	Yes	No	Department / Agency	Comments
Planners with knowledge of land development and land management practices				
Engineers or professionals trained in construction practices related to buildings and/or infrastructure				
Planners or engineers with an understanding of natural and/or human-caused hazards				
Emergency manager				
Floodplain manager				
Land surveyors				
Scientist familiar with the hazards of the community				
Staff with education or expertise to assess the community's vulnerability to hazards				
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program				
Resource development staff or grant writers				

Local Capability Assessment Survey

3. FISCAL CAPABILITY - Please indicate whether your jurisdiction has access to or is eligible to use the following local financial resources ***for hazard mitigation purposes*** (including as match funds for State of Federal mitigation grant funds). Then, identify the primary department or agency responsible for its administration or allocation and provide any other comments you may have in the space provided or with attachments.

Financial Resources	Yes	No	Department / Agency	Comments
Capital Improvement Programming				
Community Development Block Grants (CDBG)				
Special Purpose Taxes (or taxing districts)				
Gas / Electric Utility Fees				
Water / Sewer Fees				
Stormwater Utility Fees				
Development Impact Fees				
General Obligation, Revenue and/or Special Tax Bonds				
Partnering arrangements or intergovernmental agreements				
Other: _____				

Local Capability Assessment Survey

4. POLITICAL CAPABILITY - Political capability can be generally measured by the degree to which local political leadership is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). Please identify some general examples of these efforts if available and/or reference where more documentation can be found.

Local Capability Assessment Survey

5. SELF-ASSESSMENT OF CAPABILITY - Please provide an approximate measure of your jurisdiction's capability to effectively implement hazard mitigation strategies to reduce hazard vulnerabilities. Using the following table, please place an "**X**" in the box marking the most appropriate degree of capability (Limited, Moderate or High) based upon best available information and the responses provided in Sections 1-4 of this survey.

	DEGREE OF CAPABILITY		
	LIMITED	**MODERATE**	**HIGH**
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Political Capability			
OVERALL CAPABILITY			

Points System for Capability Ranking

0-19 points = Limited overall capability
20-39 points = Moderate overall capability
40-68 points = High overall capability

I. Planning and Regulatory Capability
(Up to 43 points)

Yes = 3 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Hazard Mitigation Plan
- Comprehensive Land Use Plan
- Floodplain Management Plan
- National Flood Insurance Program
- NFIP Community Rating System

Yes = 2 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Open Space Management Plan / Parks & Recreation Plan
- Stormwater Management Plan
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment / Reconstruction Ordinance

Yes = 1 point
No = 0 points

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance
- Building Code
- Fire Code

II. Administrative and Technical Capability
(Up to 15 points)

Yes = 2 points
Service provided by County = 1 point
No = 0 points

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

Yes = 1 point
No = 0 points

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

III. Fiscal Capability
(Up to 10 points)

Yes = 1 point
No = 0 points

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas / Electric Utility Fees
- Water / Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation / Revenue / Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

Appendix C
Hazard Mitigation Plan Review Tool

This section of the Plan includes a completed Local Mitigation Plan Review Tool.

Appendix D
Planning Process Documentation

This section of the Plan includes the following five (5) categories of items:

1. *SENC Regional Hazard Mitigation Planning Committee Meeting Agendas*
2. *SENC Regional Hazard Mitigation Planning Committee Meeting Sign-in Sheets*
3. *Neighboring Jurisdiction Outreach Documentation*
4. *Public Survey Advertisements and Summary Results*

AGENDA

Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting
September 18, 2019
10:00 AM – Noon

1) **Introductions**

2) **Mitigation Refresher**

3) **Icebreaker Exercise**

4) **Project Overview**
   a) Key Objectives
   b) Project Tasks
   c) Project Schedule

5) **Roles & Responsibilities**
   a) ESP Associates
   b) County Leads
   c) Participating Jurisdictions

6) **Next Steps**
   a) Initiate data collection efforts
   b) Begin public outreach
   c) Discuss next Hazard Mitigation Planning Team meeting

7) **Questions, Issues or Concerns**

AGENDA

Southeastern NC Regional Hazard Mitigation Plan
Mitigation Strategy Workshop
February 11, 2020
10:00AM - Noon

1) **Introductions**

2) **Mitigation Recap**

3) **Review Project Schedule**

4) **Risk Assessment Findings**

   a) **Hazard Identification**
   b) **Hazard Profiles**
   c) **Hazard Vulnerability Assessment**

5) **Capability Assessment Findings**

6) **Mitigation Strategy Session**

7) **Summary of Public Involvement**

8) **Plan Maintenance**

9) **Next Steps**

Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Gloria Abbotts	Carolina Beach	Carolina Beach		gloria.abbotts@ carolinabeach.org
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Audrey Hart	NHDC	Newhanover	910 338 9121	audrey@newhanover Disaster Coalition

Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Jaccazza Jones NCEM Hazard Mitigation Raleigh 919 825 2592

Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

September 18, 2019

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

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Travis Hanley	Pender County		910 259 2110	thanley@pendercountync.gov
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Ben Andrea	Town of Leland	Leland		
Craig Harris	City of Wilmington	Wilm	910 772-4135	craig.harris@wilmingtonNC.gov

Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020

10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

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Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

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Lynn Sylvia	CFCC		910-443-0156	lsylvia@cfcc.edu

Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

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Keith Dycus	Town of Ocean Isle Beach	"	910-579-3469	Keith@oibgov.com
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Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
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Southeastern NC Regional Hazard Mitigation Plan Update
Mitigation Strategy Meeting

February 11, 2020
10:00 AM - Noon

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Debora Cottle	911	Wilmington NC	910-798-6931	dcottle@nhcgov.com
STEPHEN BOYETT	BALD HEAD	BALD HEAD	910-457-9700	SBOYETT@VILLAGEBHI.ORG
Eliza Baldwin	NHC	Wilmington	798-7475	ebaldwin@nhcgov.com
Edward Dickie	Town of St. James	" "	910-253-4730	edickie@stjames.ta

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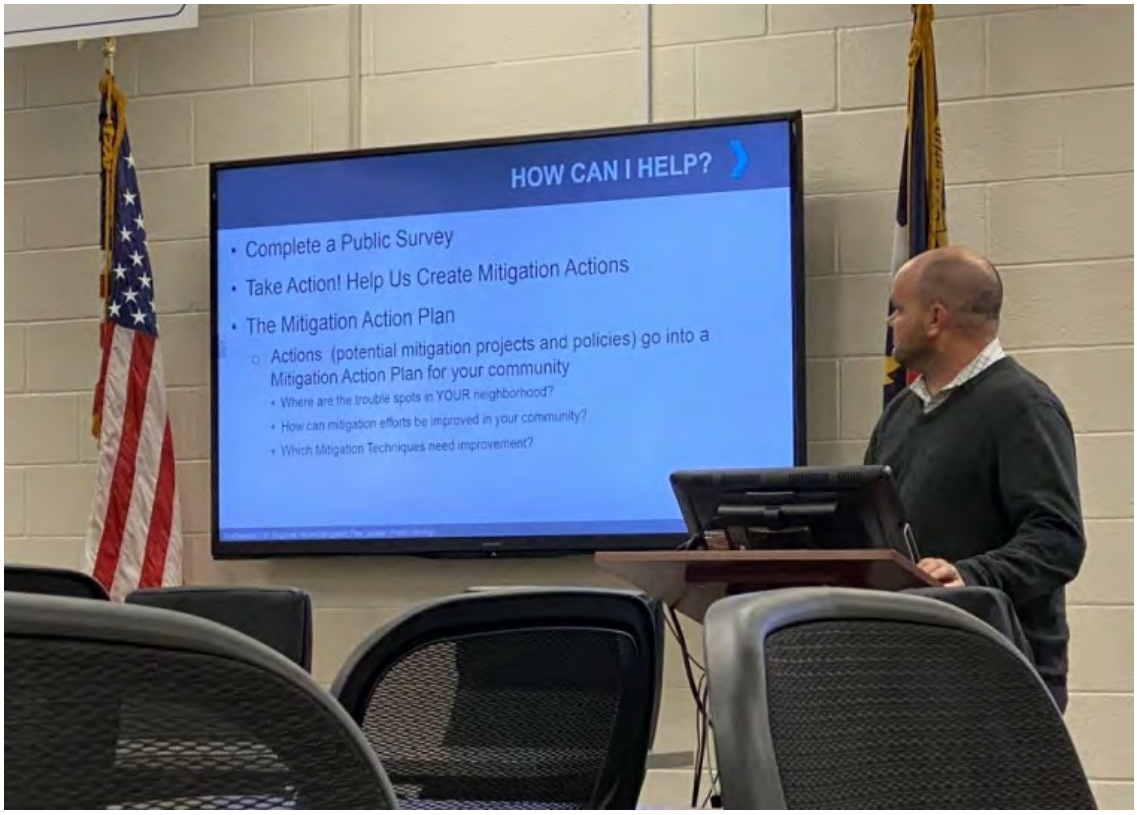
LOCAL

Mitigation planning in Onslow County



by: Aaron Deane

Posted: Nov 12, 2019 / 09:14 PM CST / Updated: Nov 12, 2019 / 09:14 PM CST

disasters are prepared.

Tuesday night ESP Associates held a Hazard Mitigation Planning Meeting. It took place in Onslow County.

The organization wants residents to weigh in and share what they feel is needed to protect communities from major impacts from disasters.

“So mitigation planning is trying to figure out things we can do before the next disaster occurs and reduce the impact of that disaster,” said Nathan Slaughter, Project Manager, ESP Associates

If you missed the meeting it’s not too late to weigh in. There is an online survey you can fill out to help project leaders.

To fill out the survey click here

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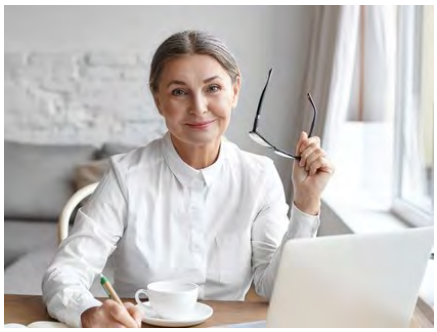

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Fire officials investigate source of apartment fire

Nov 13, 2019

GREENVILLE, N.C. - A fire investigation is underway in Greenville.

The fire happened Wednesday morning along Colonial Avenue and Contentnea Street.

Read the Full Article →

Grandmother concerned of bullying at Pitt County Schools

by Amber Joseph / Nov 12, 2019

GREENVILLE, N.C. (WNCT) "She got pushed in the bathroom. They had already said the day before in a group chat what they were going to do to her," said grandmother of Ayden student.

Read the Full Article →

How to prep your car for the freezing weather ahead

Nov 12, 2019

(WNCT) Freezing weather arrives tonight, so here is how to prep your car for the cold temperatures ahead.

We couldn't avoid the cold weather forever and not only will it create a shock to us, but also our vehicles.

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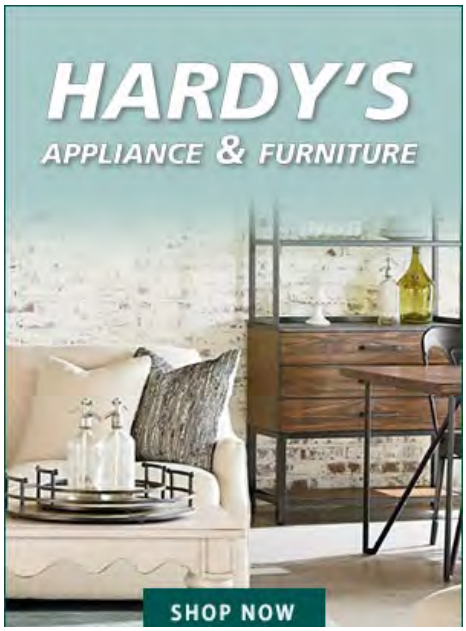

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TRENDING STORIES

1. **Grandmother concerned of bullying at Pitt County Schools**
2. **GPD: Suspect in custody in Greenville bank robbery**
3. **Under new management, iconic Wilber's Barbecue plans to reopen**
4. **Weather**
5. **Sen. Kamala Harris introduces bill to extend school day by 3 hours**

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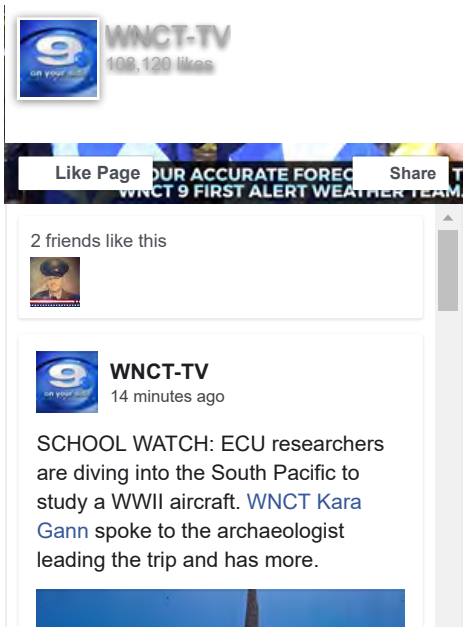

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NEW HANOVER COUNTY
Communications and Outreach

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Community invited to take survey and attend meeting about reducing risks from natural disaste

POSTED OCTOBER 17, 2019 AT 9:33 AM CATEGORY: COMMUNICATIONS & OUTREACH • EMERGENCY MANAGEMENT • ENGINEERING • NEWS RELEASE • OTHER • PLANNING /

NEW HANOVER COUNTY, NC – The public is invited to learn about regional strategies to protect life and property from natural disasters at a hazard informational meeting on October 22 at 6 p.m. This community meeting, which kicks off the update process for the Southeastern NC Regional Hazarc be held in the Paynter Room of the Northeast Library at 1241 Military Cutoff Rd.

New Hanover County participates with the City of Wilmington, beach towns, Brunswick, Onslow and Pender counties and their municipalities in the S Regional Hazard Mitigation Plan, which outlines goals and strategies to reduce the risk of damage caused by natural disasters like hurricanes, floods a plan undergoes review every five years, with the next review to be completed in 2021.

"The effects of natural disasters like hurricanes don't stop at county boarders," said New Hanover County Emergency Management Director Steven St experience impacts, so do our neighboring communities. That's why we work together to collect input and develop comprehensive strategies across (our risks from severe weather events and other threats. And an important part of this process is to hear from residents about their priorities when it hazards in our region."

Residents can participate in the development of the 2021 Southeastern NC Regional Hazard Mitigation Plan and provide input by completing a survey the New Hanover County Emergency Management Department at 230 Government Center Dr., Suite 115, Wilmington, and by attending the commun October 22.

Strategies in the Southeastern NC Regional Hazard Mitigation Plan focus on six primary focus areas for the region, as well as each participating jurisd

1. **Prevention Mechanisms** – Rules that frame the way the community grows. This includes administrative or regulatory actions around land dev building. Examples of these types of rules include zoning, building codes, open space preservation or conservation and floodplain regulations.
2. **Property Protection** – Changing existing buildings or removing buildings to prevent hazards from damaging them. Examples include buyouts, (to protect from floods), making buildings stronger and adding things like storm shutters.
3. **Natural Resource Protection –** Preserving areas, or restoring areas to original habitat to perform natural functions. This can be done in additi hazard losses. Examples include habitat preservation, slope stabilization and forest management.
4. **Emergency Services** – Actions that protect people and/or protect property during and immediately after a hazard event. Examples include pla warning systems or protecting or reinforcing emergency facilities or systems.
5. **Structural Mitigation –** Projects that lessen the impact of a hazard by changing the natural progression of the hazard. Examples include dams ponds, retaining walls and storm sewers.
6. **Public Education –** Actions that inform people about hazards and how they can protect themselves, their family and their property. Examples outreach/media campaigns, school education programs, written materials and special events.

A Hazard Mitigation Plan is required for local government to remain eligible for federal grants including the Hazard Mitigation Grant Program, Pre-Dis Program and Flood Mitigation Assistance Program, as well as Public Assistance for state-declared disasters. Participation is also credited to the county Insurance Program (NFIP) Community Rating System score. The Community Rating System is a voluntary incentive program that recognizes commun management activities that exceed the minimum NFIP requirements. Nearly half of the strategies outlined in the 2016 Southeastern NC Regional Haz directly relate to floodplain management.

To learn more, visit ReadyNHC.com.

###

Contact:
Kate Oelslager
910-798-7422

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the model of good governance

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Onslow County Emergency Services "Official"

Published by Stacie Miles [?] · 3 mins ·

*** Public Feedback Request ***

Onslow County along with the City/Town of Holly Ridge, Jacksonville, North Topsail Beach, Richlands, and Swansboro have started a planned update of the Hazard Mitigation Plan. This document helps us work towards improving hazard awareness, risk reduction and planning. As a part of this years update we have developed a community survey for our residents to participate in. This is the first of several opportunities the public will have to participate in this process. We ask that, if you are a resident of Onslow County or the municipalities, you please take a few minutes to complete the PUBLIC SURVEY at the link below. If you have any questions about the plan, please contact our office at 910-347-4270.

https://s.surveyplanet.com/HOFD76fsq

Onslow County ESD @OnslowES · 10s

Public Feedback Request: Onslow County is updating the Hazard Mitigation Plan. We have developed a community survey for our residents to participate in. Please take a few minutes to complete the survey. For questions call: 910-347-4270.
s.surveyplanet.com/HOFD76fsq

Vegetative Debris collection update/Town Notices (https://www.oakislandnc.com/general-information/town-notices/)

(https://www.facebook.com/Town-of-Oak-Island-362808684054781)

(https://twitter.com/OakIsland_Town)

(https://www.instagram.com/oakisland_town)

(https://www.oakislandnc.com)

The Town of Oak Island

910-278-5011 (tel:910-278-5011)
info@ci.oak-island.nc.us (mailto:info@ci.oak-island.nc.us)

Two chances to provide input for regional hazard mitigation plans

Southeastern NC Regional Hazard Mitigation Plan Update – Public Meeting

Brunswick, New Hanover, Onslow and Pender Counties are working together to update the Southeastern NC Regional Hazard Mitigation Plan. Natural disasters in our area are inevitably going to occur; however, the purpose of this plan is to assess the natural hazard risks that our communities face and determine how to reduce the impact when disaster strikes.

Public input and support are essential parts of this plan. In order to develop the most effective and beneficial plan possible, **your input is needed**! A public meeting will be held on Tuesday, October 22th from 6pm-7pm at the New Hanover County Northeast Library.

All interested residents from the counties and participating jurisdictions are invited to attend the meeting. By applying a collective approach to hazard mitigation plan development, we will contribute to a more resilient community! We look forward to seeing you on the 22nd!

WHEN: Tuesday, October 22, 2019 — 6-7 p.m.
WHERE: New Hanover County Northeast Library
1241 Military Cutoff Rd; Wilmington, NC 28405

Southeastern NC Regional Hazard Mitigation Plan Update – Public Meeting

Brunswick, New Hanover, Onslow and Pender Counties are working together to update the Southeastern NC Regional Hazard Mitigation Plan. Natural disasters in our area are inevitably going to occur; however, the purpose of this plan is to assess the natural hazard risks that our communities face and determine how to reduce the impact when disaster strikes.

Public input and support are essential parts of this plan. In order to develop the most effective and beneficial plan possible, **your input is needed**! A public meeting will be held on Wednesday, October 23rd from 6pm-7pm at Oak Island's Town Hall Council Chambers.

All interested residents within Oak Island's jurisdiction are invited to attend the meeting. By applying a collective approach to hazard mitigation plan development, we will contribute to a more resilient community! We look forward to seeing you on the 23rd!

WHEN: Wednesday, October 23rd, 2019 — 6-7 p.m.
WHERE: Council Chambers, Oak Island Town Hall
4601 E. Oak Island Dr., Oak Island, NC 28465

DEPARTMENTS

Staff Directory (https://www.oakislandnc.com/departments/staff-directory/)
Administration & Finance (https://www.oakislandnc.com/departments/administration-finance/)
Development Services (https://www.oakislandnc.com/departments/development-services/)
Fire Department (https://www.oakislandnc.com/departments/fire-department/)
Parks & Recreation (https://www.oakislandnc.com/departments/parks-recreation/)

Police Department (https://www.oakislandnc.com/departments/police-department/)
Public Utilities (https://www.oakislandnc.com/departments/public-utilities/)
Public Works (https://www.oakislandnc.com/departments/public-works/)

GENERAL INFORMATION

Welcome Newcomers / FAQ (https://www.oakislandnc.com/general-information/welcome-newcomers-faq/)
Flood Information (https://www.oakislandnc.com/general-information/oak-island-history/)
Link to Town Ordinances (https://www.municode.com/library/nc/oak_island/codes/code_of_ordinances)
Newsletter Signup (https://www.oakislandnc.com/general-information/newsletter-signup/)
Animal Control (https://www.oakislandnc.com/general-information/animal-control/)
Town Newsletter – The Tribune (https://www.oakislandnc.com/wp-content/uploads/2019/10/TribuneOct2019.pdf)
Current Budget (https://www.oakislandnc.com/wp-content/uploads/2019/07/FY2019-2020_Budget.pdf)
Fee Schedule (https://www.oakislandnc.com/wp-content/uploads/2019/07/FY2019-20FeeSchedule_July2019.pdf)
OKI Brochure – Area Map (https://www.oakislandnc.com/wp-content/uploads/2019/05/OKI_BrochureMap.pdf)

EMERGENCY INFORMATION

Hurricane Preparedness (https://www.oakislandnc.com/emergency-info/hurricane-preparedness/)
Evacuation Info (https://www.oakislandnc.com/emergency-info/evacuation-info/)
Bridge Info (https://www.oakislandnc.com/emergency-info/bridge-info/)
If You Stay (https://www.oakislandnc.com/emergency-info/if-you-stay/)
After the Storm (https://www.oakislandnc.com/emergency-info/after-the-storm/)
Emergency Announcements (https://www.oakislandnc.com/emergency-info/emergency-announcements/)
Recovery Info (https://www.oakislandnc.com/?page_id=7071)

TOWN HALL

Town Council (https://www.oakislandnc.com/town-hall/town-council/)
Agendas, Minutes, Etc. (https://www.oakislandnc.com/town-hall/council-agendas-minutes-etc/)
Boards & Committees (https://www.oakislandnc.com/town-hall/boards-committees/)
Meetings Calendar (https://www.oakislandnc.com/town-hall/meetings/)
Links (https://www.oakislandnc.com/area-links/)

The Town of Oak Island NORTH CAROLINA

(https://www.oakislandnc.com)

4601 E. Oak Island Drive, Oak Island, NC 28465

Phone: 910-278-5011 (tel:910-278-5011) | Email: info@ci.oak-island.nc.us (mailto:info@ci.oak-island.nc.us)

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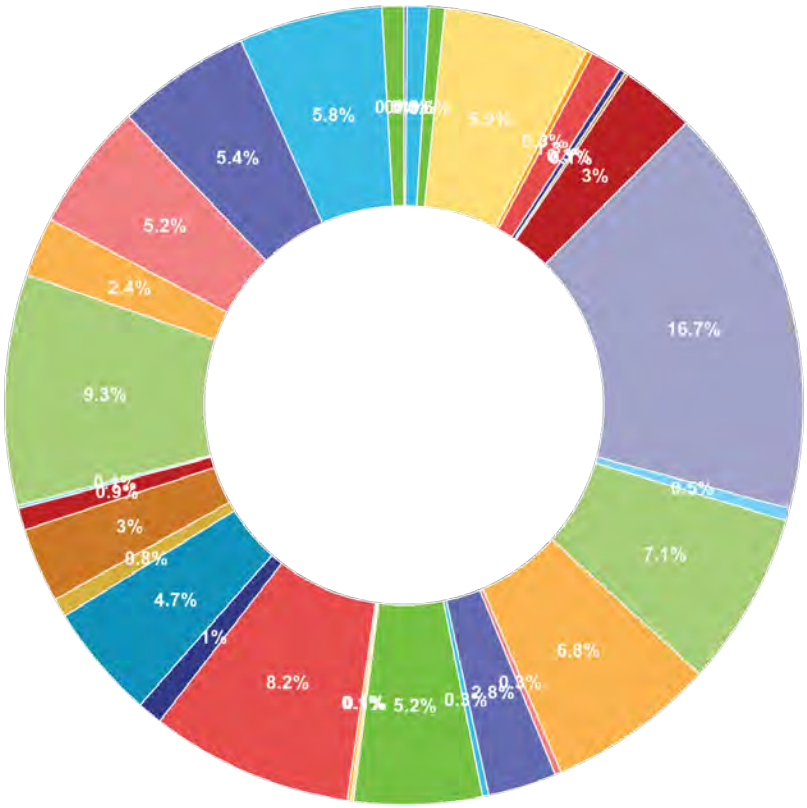
Custom Website Design (https://webworks89.com) by Webworks89

Southeastern NC Regional Hazard Mitigation Plan Update - Public Survey

We need your help!

Q1 1\. Where do you live?*

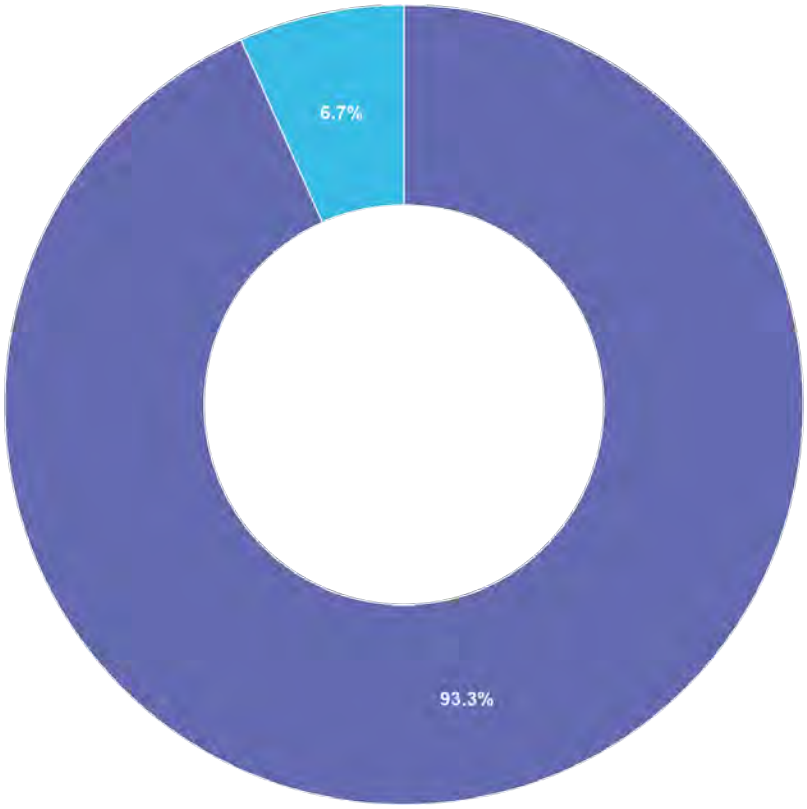


Answered: 792 **Unanswered:** 0

Choice	Total
Atkinson	1
Bald Head Island	7
Belville	5
Boiling Spring Lakes	47
Bolivia	2
Burgaw	10
Calabash	2
Carolina Beach	0
Carolina Shores	0
Caswell Beach	0

Choice	Total
Holden Beach	1
Holly Ridge	24
Jacksonville	132
Kure Beach	4
Leland	56
Navassa	0
North Topsail Beach	54
Northwest	2
Oak Island	22
Ocean Isle Beach	2
Richlands	41
Sandy Creek	1
Shallotte	1
Southport	65
St. James	8
Sunset Beach	37
St. Helena	0
Surf City	6
Swansboro	24
Topsail Beach	7
Varnamtown	0
Watha	1
Wilmington	74
Wrightsville Beach	0
Unincorporated Brunswick County	19
Unincorporated New Hanover County	41
Unincorporated Pender County	43
Unincorporated Onslow County	46
__archived__	7

Q2 2\. Have you ever experienced or been impacted by a disaster in Brunswick, New Hanover, Onslow, or Pender Counties?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	739
No	53

Q3 3\. If "Yes," please explain.

Thursday, April 16, 2020, 12:23 PM UTC

Hurricane - power out for a week, damage to roof

Monday, March 2, 2020, 6:17 PM UTC

I have lived in NHC during Matthew, Michael, Dorian and especially Florence.

Monday, December 9, 2019, 10:06 PM UTC

Lived in Shallotte during Matthew and Boiling Spring Lakes during Florence. Worked in BSL during both. After
Florence I had no access to my residence for several days and could not care for the cats in my home. Got a ride from someone with 4-wheel drive on Sunday to check on, clean up after and feed them. Lost food in refrigerator. Road washouts prevented being able to leave the City for few days and limited access to my residence until detour established later in week. No water. Increased workload at my job.

Monday, November 25, 2019, 12:48 PM UTC

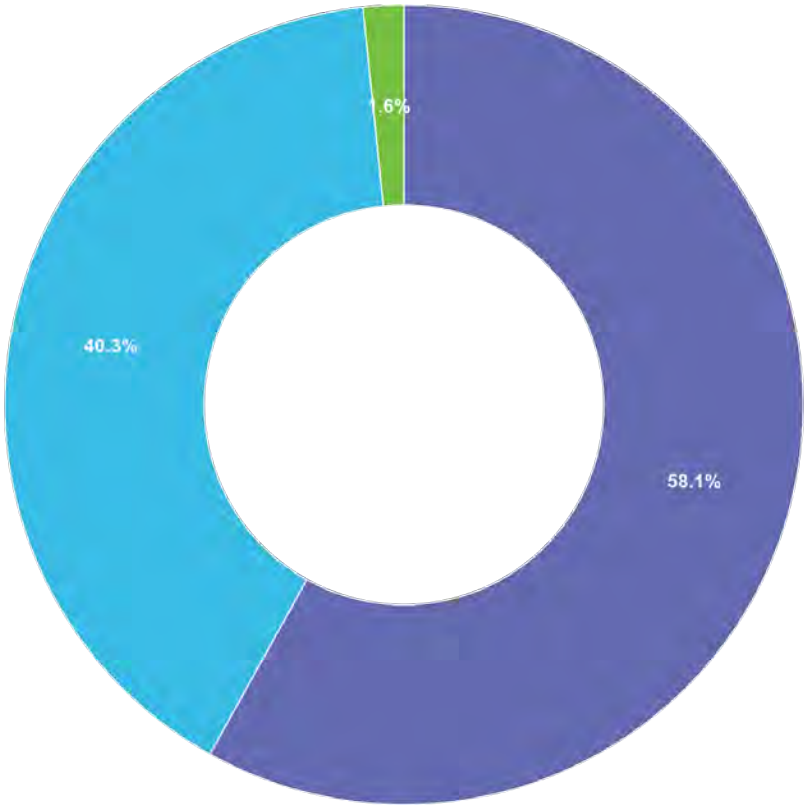
We've evacuated for two hurricanes, including Florence after which we were stranded and couldn't get back to the area for weeks.

Tuesday, November 19, 2019, 4:46 PM UTC

Hurricane Florence

Answered: 718 **Unanswered:** 74

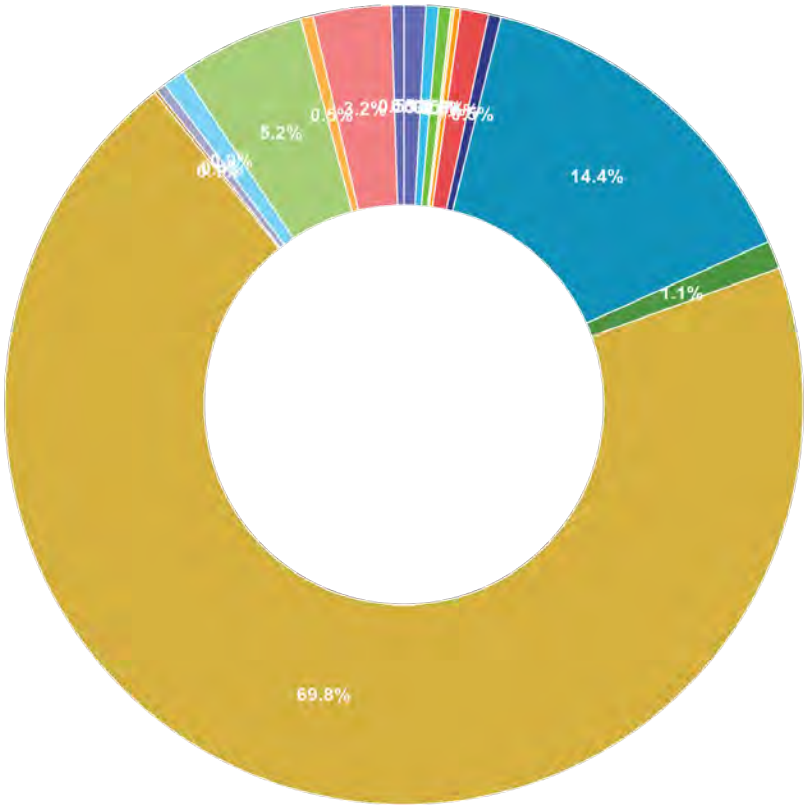
Q4 4\. How concerned are you about the possibility of your community being impacted by a disaster?*



Answered: 792 **Unanswered:** 0

Choice	Total
Extremely concerned	460
Somewhat concerned	319
Not concerned	13

Q5 5\. Please select the **one** hazard you think is the highest threat to your neighborhood:*

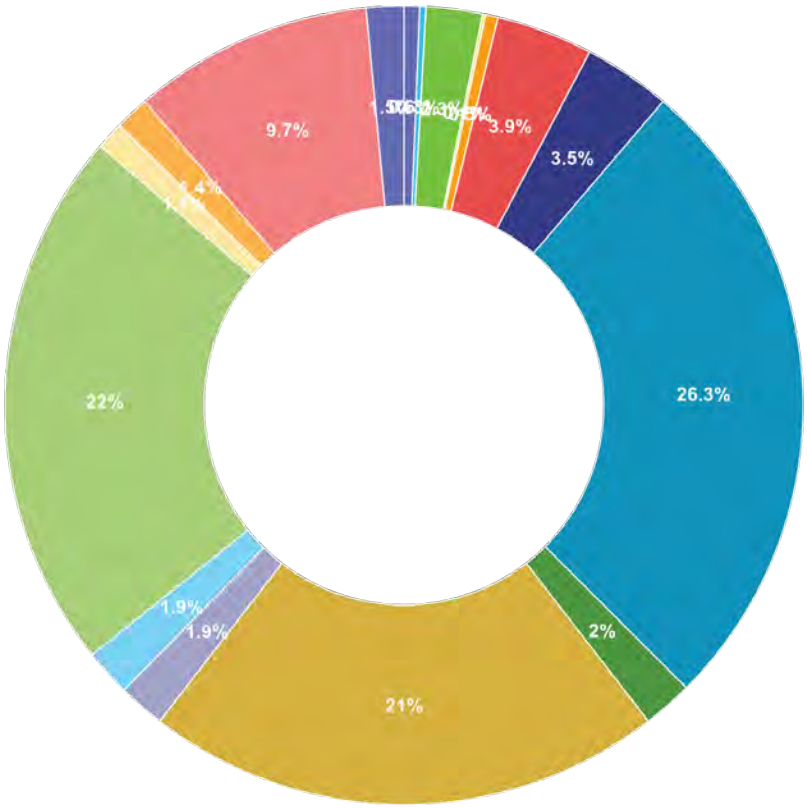


Answered: 792 **Unanswered:** 0

	Choice	Total
	Cyber Attack	7
	Dam Failure	4
	Drought	4
	Earthquakes	1
	Electromagnetic Pulse (EMP)	2

Choice	Total
Erosion	9
Excessive Heat	4
Flooding	114
Hazardous Substances	9
Hurricane and Coastal Hazards	553
Infectious Disease	1
Landslides	0
Lightning	3
Radiological Emergency	7
Severe Thunderstorms/High Winds	41
Severe Winter Weather	0
Terrorism	4
Tornadoes	25
Wildfire	4

Q6 6\. Please select the **one** hazard you think is the second highest threat to your neighborhood:*



Answered: 792 **Unanswered:** 0

Choice	Total
Cyber Attack	5
Dam Failure	2
Drought	18
Earthquake	1
Electromagnetic Pulse (EMP)	4
Erosion	31
Excessive Heat	28
Flooding	208
Hazardous Substances	16
Hurricane and Coastal Hazards	166

Choice	Total
Infectious Disease	0
Landslides	0
Lightning	15
Radiological Emergency	15
Severe Thunderstorms/High Wind	174
Severe Winter Weather	9
Terrorism	11
Tornado	77
Wildfire	12

Q7 7\. Are there any other hazards that you feel pose a wide-scale threat to your community? If so, please explain:

Monday, March 2, 2020, 6:17 PM UTC

They all do. After Hurricanes and Radiological, I'd rate Infectious Disease, Tornadoes, and Terrorism/ Active Shooter.

Monday, December 9, 2019, 10:06 PM UTC

Wild fires started by careless burn of yard waste and other materials.

Monday, November 25, 2019, 12:48 PM UTC

I do worry about the PFAs found in the foam used as fire suppressant OB military bases. They've been found in much higher concentrations in the water in the areas near bases, and I'm worried about what impact that has on long term health.

Tuesday, November 19, 2019, 4:46 PM UTC

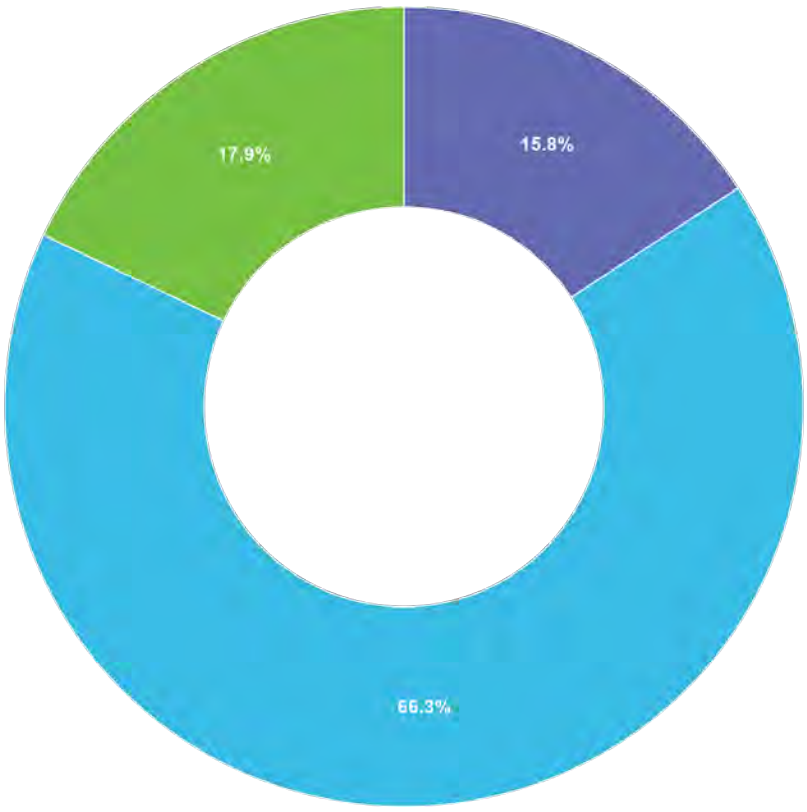
Contamination of the drinking water from the military base

Tuesday, November 19, 2019, 4:17 PM UTC

Flooding

Answered: 391 **Unanswered:** 401

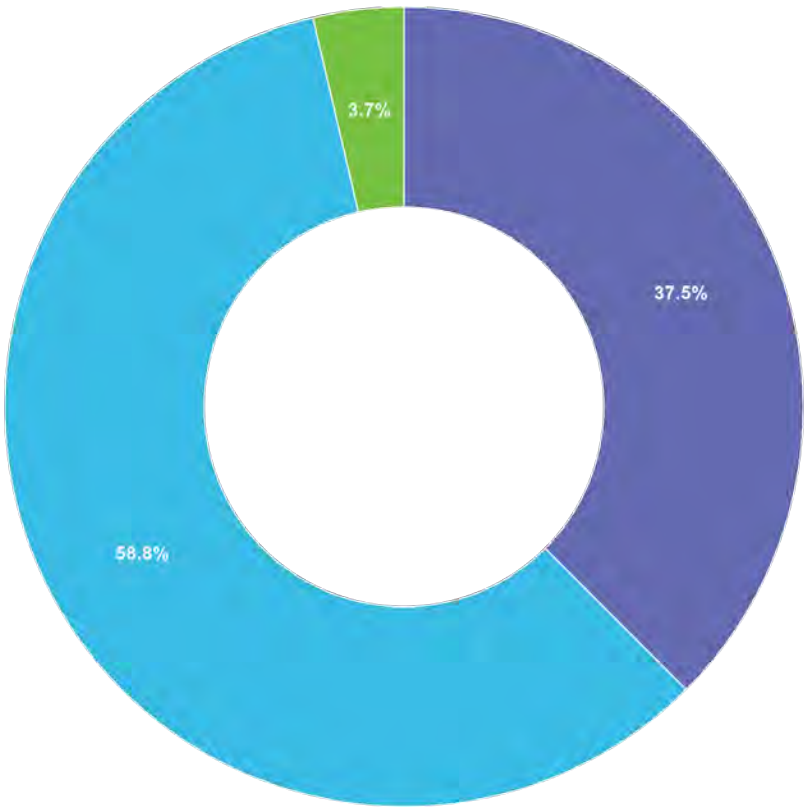
Q8 8\. Is your home located in a floodplain?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	125
No	525
I'm not sure	142

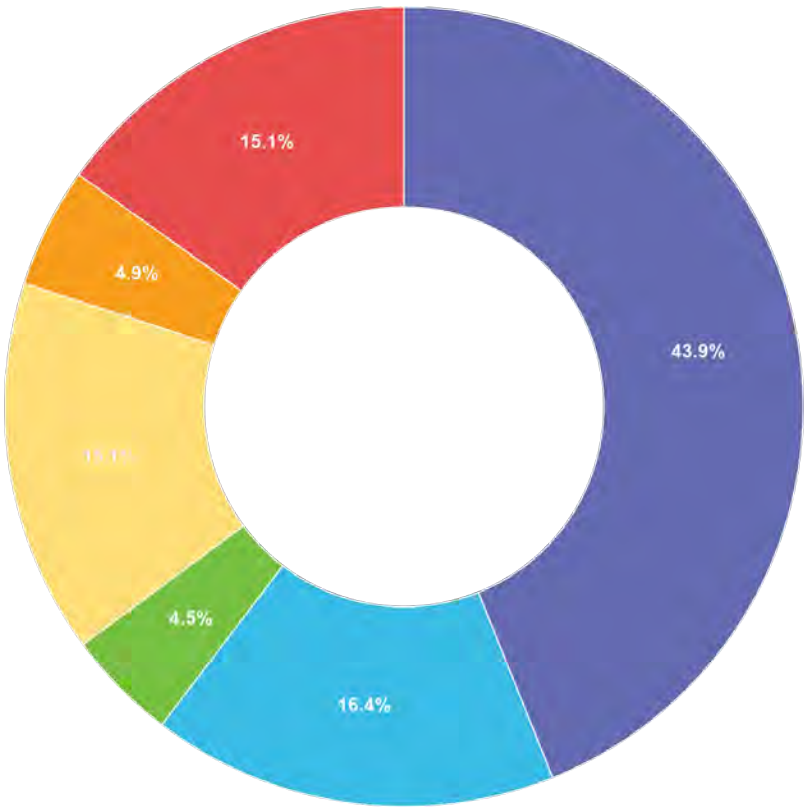
Q9 9\. Do you have flood insurance?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	297
No	466
I'm not sure	29

Q10 10\. If you do not have flood insurance, why not?



Answered: 535 **Unanswered:** 257

Choice	Total
Not located in floodplain	235
Too expensive	88
Not necessary because it never floods	24
Not necessary because I am elevated or otherwise protected	81
Never really considered it	26
Other	81

Q11 11\. If "Other," please explain:

Wednesday, November 13, 2019, 4:22 PM UTC

We have flood insurance on our primary home. Our secondary home is uninsurable and we didn't know that at the time of purchase.

Friday, October 25, 2019, 4:50 PM UTC

Just moved here; plan on getting it.

Friday, October 25, 2019, 3:42 PM UTC

I purchase flood insurance every year, but never needed to use it. Still, for cat 3, 4, or 5...I want to be sure.

Friday, October 25, 2019, 12:25 PM UTC

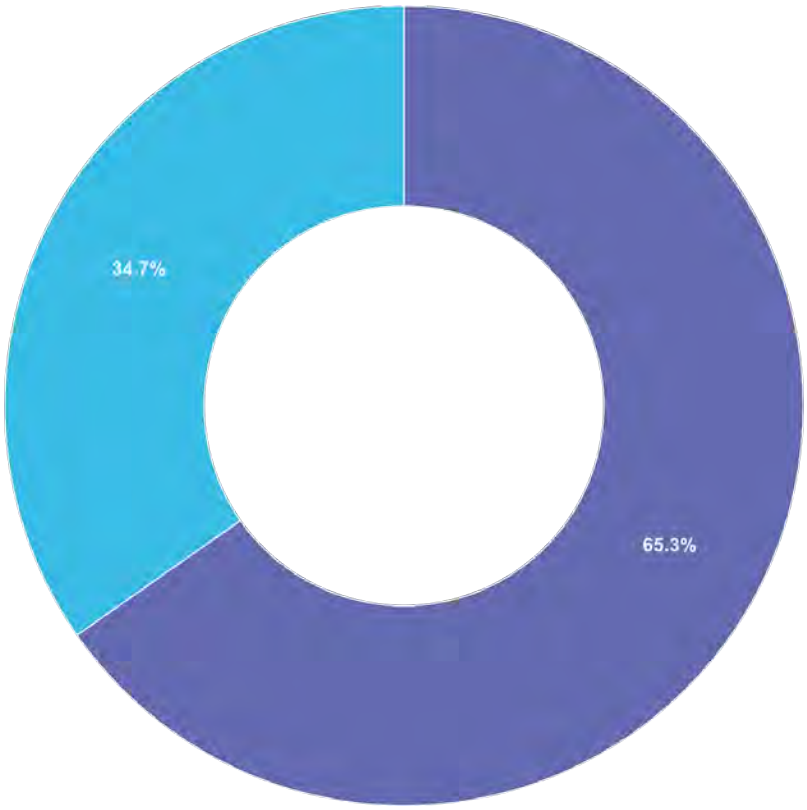
Rental

Sunday, October 20, 2019, 1:46 PM UTC

We are currently working with our insurance agent on the options for having flood insurance.

Answered: 102 **Unanswered:** 690

Q12 12\. Have you taken any steps to make your home or neighborhood more resistant to hazards?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	517
No	275

Q13 13\. If "Yes," please explain:

Monday, November 25, 2019, 12:48 PM UTC

We've made sure our trees are trimmed, gutters are cleaned out regularly, and our roof is in good repair.

Tuesday, November 19, 2019, 4:46 PM UTC

Have supplies in home to prepare for many of previous events, have a plan go evacuate.

Tuesday, November 19, 2019, 2:58 PM UTC

Better preparation for future hurricanes and flooding.

Thursday, November 14, 2019, 5:07 PM UTC

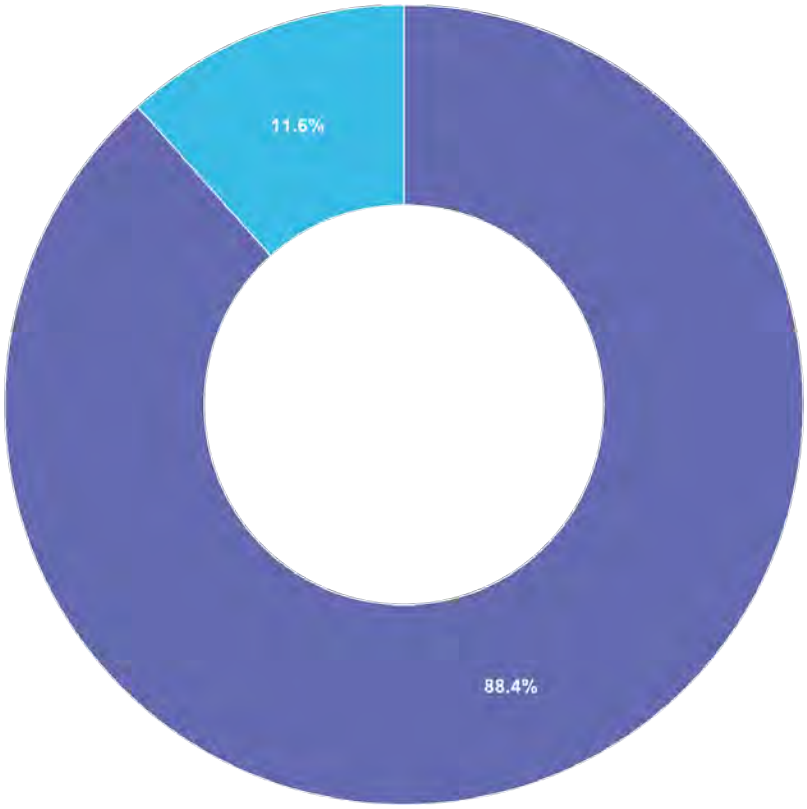
Equipment is raised to FEMA requirements, house is built on a slab, flood vents in garage door

Thursday, November 14, 2019, 12:15 PM UTC

Weather alert, shutters,

Answered: 459 **Unanswered:** 333

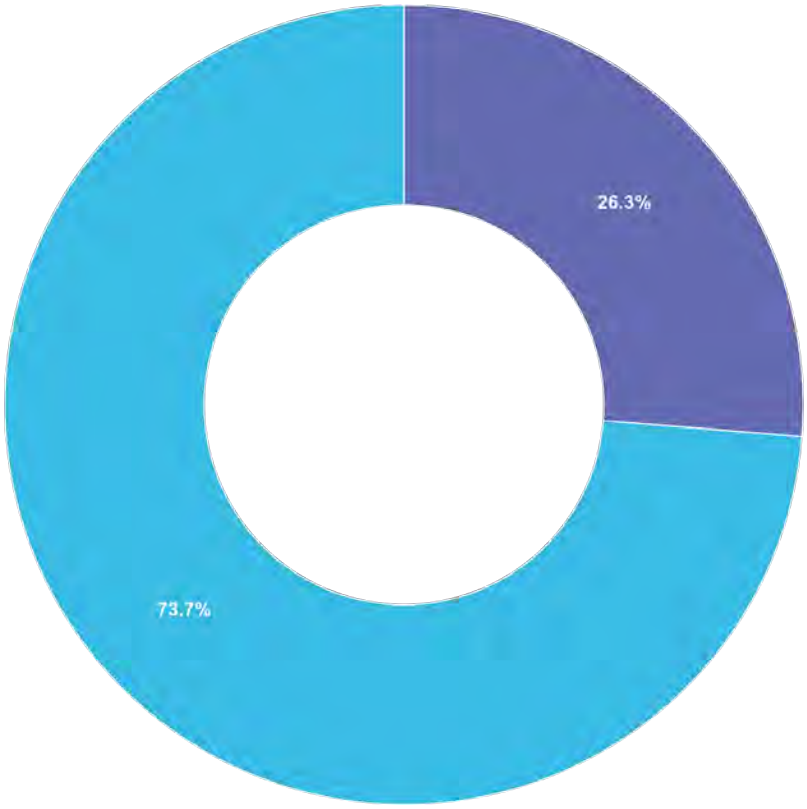
Q14 14\. Are you interested in making your home or neighborhood more resistant to hazards?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	700
No	92

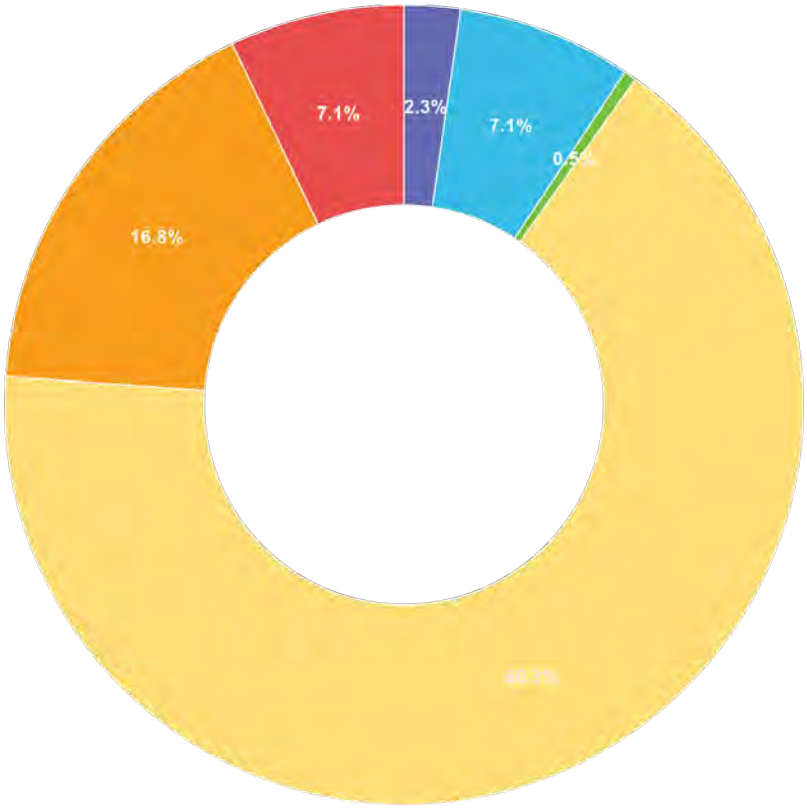
Q15 15\. Do you know what office to contact to find out more information about how to reduce your risks to hazards in your area?*



Answered: 792 **Unanswered:** 0

Choice	Total
Yes	208
No	584

Q16 16\. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?*



Answered: 792 **Unanswered:** 0

Choice	Total
Newspaper	18
Television	56
Radio	4
Internet (including social media)	525
Mail	133

Choice	Total
Public Workshops/Meetings	56
School Meetings	0

Q17 17\. Are there any other ways you prefer to receive information? If so, please explain:

Monday, December 9, 2019, 10:06 PM UTC

Website and Mail

Friday, November 15, 2019, 3:37 AM UTC

Local media (TV, newspapers).

Thursday, November 14, 2019, 5:07 PM UTC

Email, phone, regular mail

Tuesday, November 5, 2019, 1:30 PM UTC

internet

Tuesday, October 29, 2019, 12:37 AM UTC

Emails

Answered: 298 **Unanswered:** 494

Q18 18\. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

Monday, March 2, 2020, 6:17 PM UTC

I think Emergency Management needs to get out into the community and be more proactive. Also given the experience of Florence, I think terrestrial radio is under-utilized. The best source of information for everyone was the the local Cumulus radio studio. They were able to stay on air. They broadcast on all their AM/FM frequencies, a single feed. They were able to sustain through donated generator fuel. SE NC EMs should have taken a lesson learned there. A conversation with NHC EM team in Jan 2020, indicated they missed the value to the public this radio network provided. Everyone has a radio, even if it's just in their car.

Monday, December 9, 2019, 10:06 PM UTC

Storm water drainage management through property acquisition, both purchase and easements. Buy out and relocate homes in flood prone areas. Find alternatives and incentives for commercial development not to pave any more parking spaces than necessary (i.e. handicap spaces)

Tuesday, November 19, 2019, 4:46 PM UTC

Community engagement opportunities to prepare area, free education (like being a vendor at the many events that go on in area)

Tuesday, November 19, 2019, 4:17 PM UTC

Ensure buildings and home are built to withstand high winds, re-evaluate flood areas, don’t build in areas susceptible to flooding, better education on how to secure your home and ensuring storm drains are not covered or blocked.

Tuesday, November 19, 2019, 2:58 PM UTC

I don’t know

Answered: 542 **Unanswered:** 250

Q19 19\. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important? If so, please explain:

Monday, March 2, 2020, 6:17 PM UTC

I think local plans for infectious outbreak need to be on the local news this month,

---

Monday, December 9, 2019, 10:06 PM UTC

The city needs to provide sand for citizens to fill sandbags to protect their property in flood prone areas.

Friday, November 15, 2019, 3:37 AM UTC

Make access to low interest loans available to homeowners that have previous coastal flood events who wish to elevate their homes.

Thursday, November 14, 2019, 12:15 PM UTC

Storm recovery

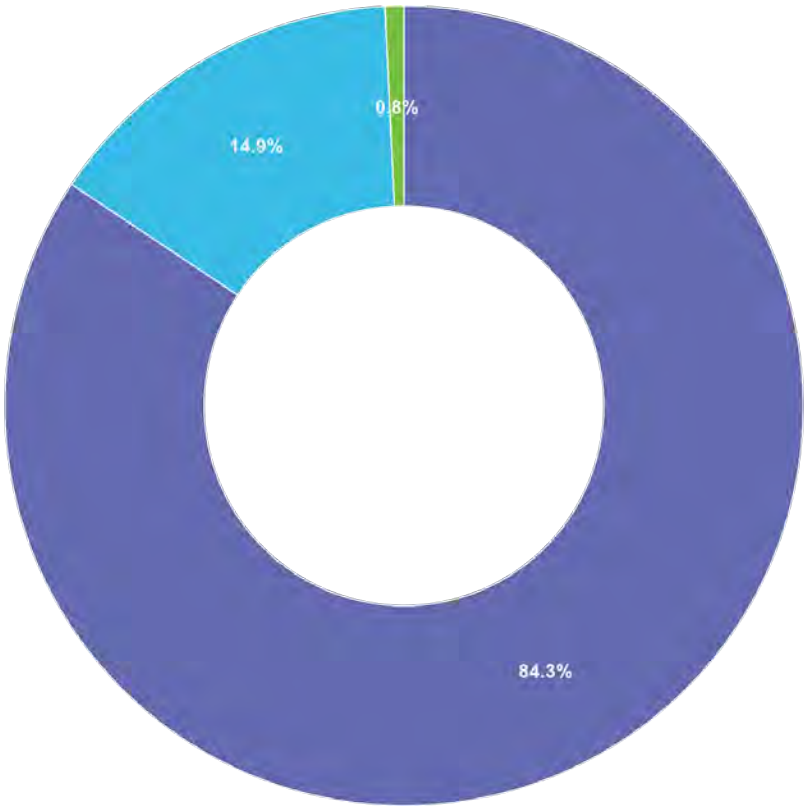
Thursday, November 14, 2019, 1:04 AM UTC

Better management of street drainage and runoff.

Answered: 226 **Unanswered:** 566

Q20 A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. In the next six questions, please tell us how important you think each one is for your community to consider pursuing.

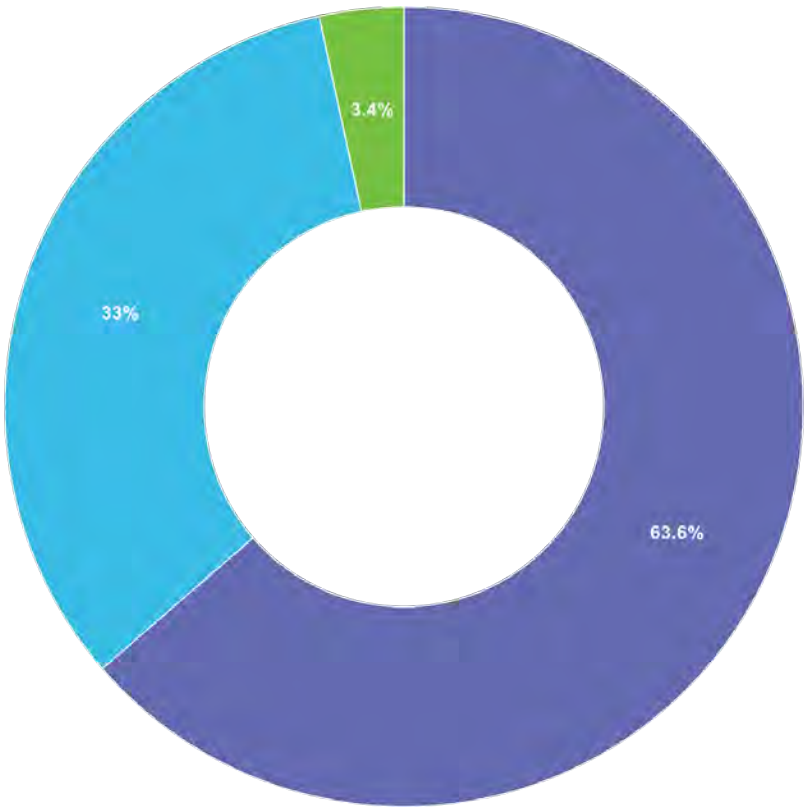
20\. **Prevention** - Rules that frame the way the community grows. This includes administrative or regulatory actions around land development and building. Examples of these types of rules include zoning, building codes, open space preservation or conservation and floodplain regulations.*



Answered: 792 **Unanswered:** 0

Choice	Total
Very important	668
Somewhat important	118
Not important	6

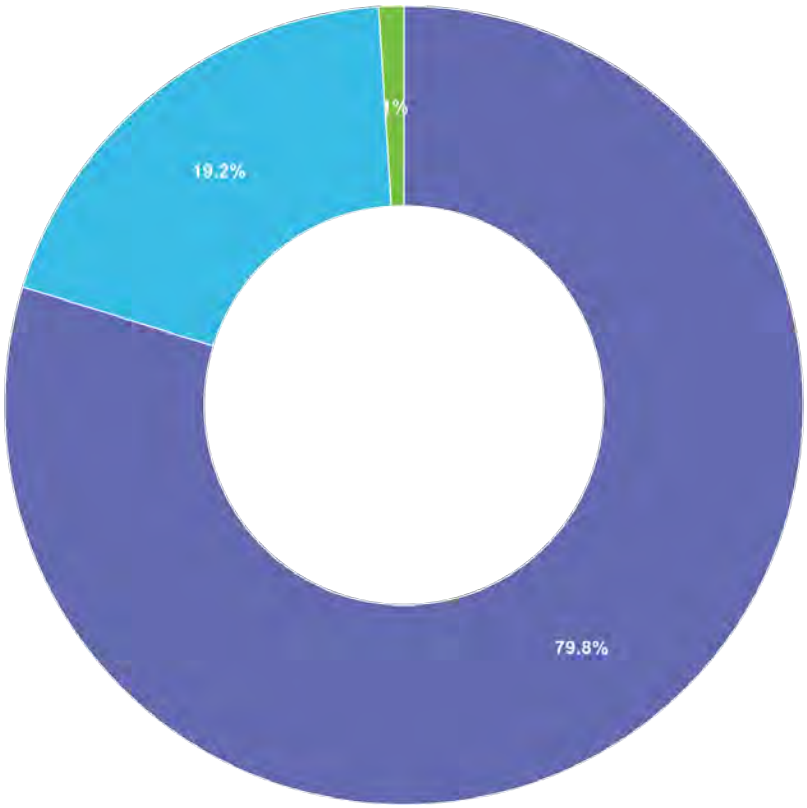
Q21 21\. **Property Protection** - Changing existing buildings or removing buildings to prevent hazards from damaging them. Examples include buyouts, relocation, elevation (to protect from floods), making buildings stronger and adding things like storm shutters.*



Answered: 792 **Unanswered:** 0

Choice	Total
Very important	504
Somewhat important	261
Not important	27

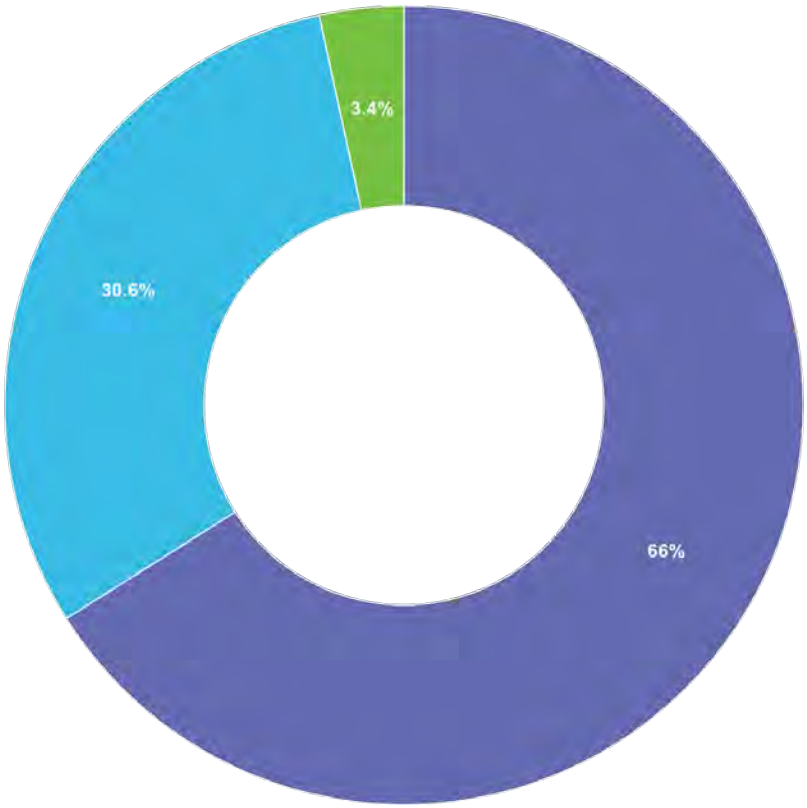
Q22 22\. **Natural Resource Protection** - Preserving areas, or restoring areas to original habitat to perform natural functions. This can be done in addition to minimizing hazard losses. Examples include habitat preservation, slope stabilization and forest management.*



Answered: 792 **Unanswered:** 0

	Choice	Total
	Very important	632
	Somewhat important	152
	Not important	8

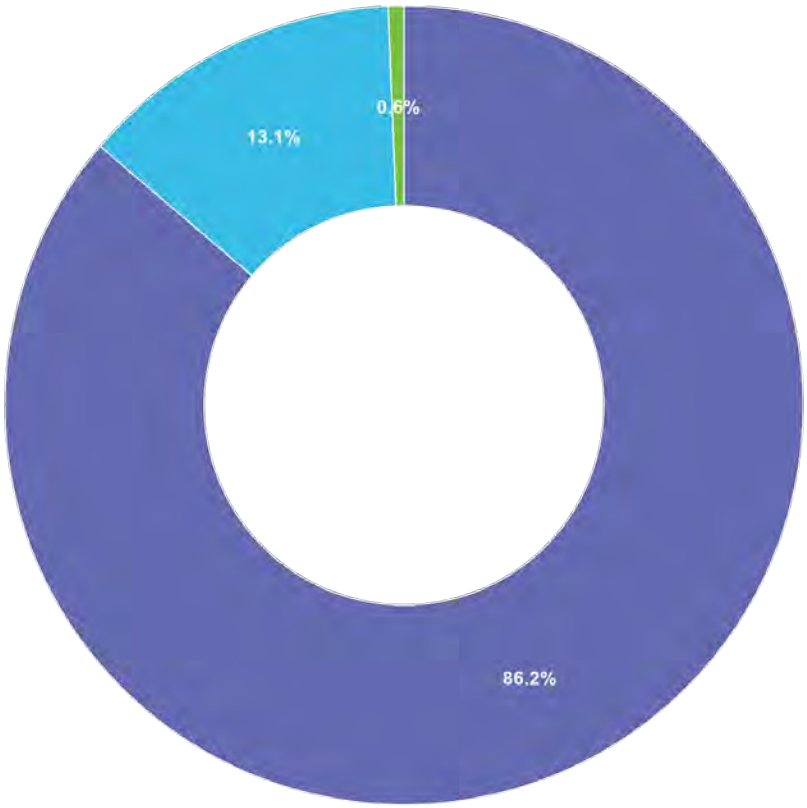
Q23 23\. **Structural Projects** - Projects that lessen the impact of a hazard by changing the natural progression of the hazard. Examples include dams, levees, retention ponds, retaining walls and storm sewers.*



Answered: 792 **Unanswered:** 0

	Choice	Total
	Very important	523
	Somewhat important	242
	Not important	27

Q24 24\. **Emergency Services** - Actions that protect people and/or protect property during and immediately after a hazard event. Examples include planning for evacuation, warning systems or protecting or reinforcing emergency facilities or systems.*

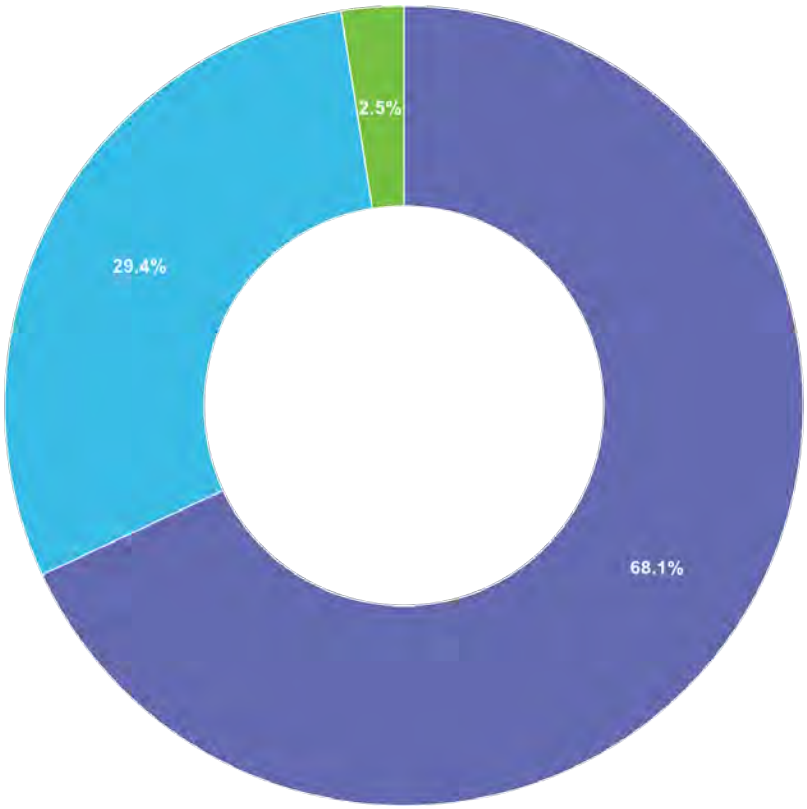


Answered: 792 **Unanswered:** 0

	Choice	Total
	Very important	683
	Somewhat important	104
	Not important	5

Q25 25\. **Public Education and Awareness** - Actions that inform people about hazards and how they can protect themselves, their family and their property. Examples include outreach/media campaigns, school education programs, written materials and special

events.*



Answered: 792 **Unanswered:** 0

	Choice	Total
●	Very important	539
●	Somewhat important	233
●	Not important	20

Q26 This survey may be submitted anonymously; however, if you provide us with your name and contact information below, we will have the ability to follow up with you to learn more about your ideas or concerns. (Optional)

Monday, March 2, 2020, 6:17 PM UTC

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Thursday, November 14, 2019, 2:28 AM UTC

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Answered: 208 **Unanswered:** 584

Appendix E: Completed Mitigation Actions

This section includes the mitigation actions that have been completed over the years by the participating jurisdictions.

The following provides a summary of progress achieved with regard to the strategies adopted through the 2011 Brunswick County Multi-Jurisdictional Hazard Mitigation Plan.

Brunswick County

Strategy P-1: Set up program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (Retrofitting is defined as any modification to an existing building or yard to protect the property from flood damage.) (CRS 320)

Progress: The Brunswick County Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, B26, B47

Strategy P-2: Continue/expand efforts to partner with area utility districts to encourage proper development of regional sewer systems.

Progress: Brunswick County has worked closely with local sewer districts to facilitate sound expansion over the last five years. All participating jurisdictions will continue to support County-wide infrastructure expansion through this plan update.

Status/Corresponding 2015 Strategy: BC2

Strategy P-3: When possible, ensure that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE). (CRS 430)

Progress: This strategy has been revised and will be maintained through the plan update.

Status/Corresponding 2015 Strategy: BC3

Strategy P-4: Participate in the voluntary purchase of land parcels located in hazard areas or rendered unbuildable by storms or other events, for the purpose of shorefront access.

Progress: The County, as well as participating jurisdictions, continue to except land gifts or donations as a mitigation tool. This strategy has been revised through this update.

Status/Corresponding 2015 Strategy: BC4

Strategy P-5: Continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services – fire, rescue, medical, etc.

Progress: Over the last five years, the County has annually reviewed the viability of critical facilities and services through implementation of the County Emergency Operations Plan (EOP). The County will continue to evaluate critical facilities and services through annual EOP practices, procedures and exercises. The strategy has been revised through this update.

Status/Corresponding 2015 Strategy: BC5

Strategy P-6: Maintain County Storm Water Ordinance (effective September 16, 2002) in conjunction with land use ordinances for compatibility of EPA Phase II NPDES requirements.

Progress: Brunswick County continues to maintain, review, and update as necessary the County Stormwater Management Ordinance. This effort will continue to serve as an active component of the County's NPDES Phase II Stormwater Program.

Status/Corresponding 2015 Strategy: BC6

Strategy P-7: Complete Community Rating System Application using Hazard Mitigation Plan components to fulfill application requirements.

Progress: Brunswick County has not completed an application to join the CRS to date. The County, as well as other non-Community Rating System (CRS) participants (refer to page 4-10 and 4-11 for a summary of participating communities) will consider applying for inclusion in the program through implementation of this plan update.

Status/Corresponding 2015 Strategy: BC7

Strategy P-8: Continue to address and strengthen approach to "scattered and sprawling, large lot subdivision activity," "unplanned commercial strip development," "sewage problems and sewage solutions," and "storm water runoff and drainage."

Progress: This strategy was completed through update and adoption of the County's Unified Development Ordinance within the last five years.

Status/Corresponding 2015 Strategy: Completed.

Strategy P-9: Strengthen the land use classification system by more closely defining allowed uses and designating certain areas as off limits to development.

Progress: The County reviews and updates the Land Use Plan and the Unified Development Ordinance on a regular basis. These efforts will continue; therefore, this strategy has been eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-10: Develop an open space plan; target key properties for an open space acquisition program. (CRS420)

Progress: Strategies P-8 through P-11 of the existing Brunswick County HMP address the issue of establishing and/or modifying Land Use Planning policy and regulatory mechanisms in an effort to promote sound development within known high hazard areas. These strategies have been simplified and formulated into a general statement of intent regarding review and update of County and municipal Land Use Plans and relevant land development codes.

Status/Corresponding 2015 Strategy: BC4, BC8, BC10, BC27

Strategy P-11: Strengthen policies regarding directing urban level growth to appropriate locations where services can be provided.

Progress: The County periodically reviews and updates its Land Use Plan and Unified Development Ordinance. This strategy has been simplified and formulated into a general statement of intent regarding review and update of County and municipal Land Use Plans and relevant land development codes.

Status/Corresponding 2015 Strategy: BC8, BC10

Strategy P-12: Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE. All substantially damaged buildings should be elevated to this level (CRS 430).

Progress: The County, as well as all participating jurisdictions, reviews and updates their respective Flood Damage Prevention Ordinances as deemed necessary, or when mandated by NCDPS and/or FEMA through the NFIP. Additionally, all existing locally adopted Base Flood Elevation standards will be maintained.

Status/Corresponding 2015 Strategy: BC9

Strategy P-13: Evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.

Progress: Brunswick County reviewed and updated its Unified Development Ordinance in March 2015. The County and all participating jurisdictions, will continue to review, and update as necessary, their respective Zoning and Subdivision regulations to ensure that regulatory standards remain aligned with local and regional Future Land Use Planning policy documents.

Status/Corresponding 2015 Strategy: BC10

Strategy P-14: Continue efforts to revise, update, and improve subdivision regulations particularly with regard to open space and tree preservation.

Progress: Brunswick County reviewed and updated its Unified Development Ordinance (which includes subdivision regulations) in March 2015. The County and all participating jurisdictions will continue to review and update, as necessary, their respective Zoning and Subdivision regulations to ensure that regulatory standards remain aligned with local and regional Future Land Use Planning policy documents.

Status/Corresponding 2015 Strategy: BC10, BC12

Strategy P-15: Continue to improve road access standards to protect the integrity of significant traffic- carrying roadways throughout the County.

Progress: This strategy has been revised to more specifically address the deficiencies and needs relevant to all state maintained right-of-ways throughout the County.

Status/Corresponding 2015 Strategy: BC11

Strategy P-16: Employ specific provisions of the zoning ordinance, subdivision regulations, and infrastructure improvement plans to encourage a town and country development pattern.

Progress: The general intent of this strategy is being carried forward into the 2015 update; however, the terminology has been modified to more clearly define the desired outcome regarding land development types enabled through both County and municipal land development codes.

Status/Corresponding 2015 Strategy: BC10, BC12

Strategy P-17: Continue to count building improvements cumulatively (maintain permit history so when cumulative improvements equal 50% of building value (substantial improvement) building must be brought up to flood protection standards for new construction) with a goal to eventually have all flood hazard endangered buildings brought up to flood protection standards (CRS 430).

Progress: This strategy has been eliminated from the plan update due to the difficulty in logistically maintaining accurate information necessary to enforce this standard. Additionally, it was decided that imposing this standard on property owners would be excessively burdensome and costly.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-18: Review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.

Progress: This strategy is still in place and a function of the response and recovery process outlined in the County's Emergency Operations Plan.

Status/Corresponding 2015 Strategy: BC13

Strategy P-19: Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain (CRS 310).

Progress: The County, as well as all participating municipalities, continues to require the submittal of FEMA Elevation Certificates for development within the defined Flood Hazard Area. This strategy has been updated to reflect current regulatory and record keeping requirements.

Status/Corresponding 2015 Strategy: BC14

Strategy P-20: Review written policies on water and sewer system extensions and tap on policies to ensure that the County is adequately addressing and discouraging inappropriate development in sensitive environmental areas and areas prone to flood or storm surge hazards.

Progress: The County, as well as municipal jurisdictions operating a central water system periodically review extension and tap policies to potentially limit development density in areas identified as high hazard. This strategy will be continued through this planning process.

Status/Corresponding 2015 Strategy: BC15

Strategy P-21: Continue to allot capital funding for the implementation of hazard mitigation activities.

Progress: The County, as well as all participating jurisdictions, maintain a policy of taking the results and data associated with this plan into account when making decisions regarding capital expenditures relating to infrastructure and facility expansion and development.

Status/Corresponding 2015 Strategy: BC16

Strategy P-22: Consider a shoreline overlay district to include requirements for more intense review of proposed drainage, and limitation on the type of land uses allowed within the overlay district.

Progress: This strategy has been eliminated due to the fact that establishment of an overlay district impacting the coastline would involve intergovernmental coordination among a number of Beach Towns. Achievement of an effective policy and resulting regulatory framework is not possible at this time.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-23: Implement specific zoning standards to discourage or prohibit floating homes from locating in public trust waters.

Progress: This strategy has been eliminated, due to the fact that Brunswick County does not have the jurisdiction to zone public trust waters.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-24: Inventory existing lots and structures within flood hazard areas to establish baseline data regarding current state of development.

Progress: This effort was carried out during the former planning process. The County will continue to monitor and update the vulnerability analysis presented in this plan as an indicator of development subject to threats associated with natural disasters. This data will be factored into discussions associated with future Comprehensive Planning efforts at the County and municipal levels.

Status/Corresponding 2015 Strategy: BC10, BC17

Strategy P-25: Continue to support greater residential densities in areas that are accessible to water and/or sewer service(s). Agricultural and low-density residential land uses should be located in areas that do not have central water or sewer service.

Progress: This strategy has been eliminated through this update due to the extensive availability of central infrastructure services. Local Land Use Plan and Zoning Standards now serve as the predominant factor in dictating future built densities in both residential and non-residential zoning districts.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-26: Support commercial forestry activities, provided significant adverse impacts on natural resource systems are fully mitigated. Such activities should be considered in accordance with the standards and recommendations of the US Forest Service. The County also advocates the voluntary participation of commercial forestry interests in the State of North Carolina's best management practice program for forestry management.

Progress: This strategy is still being carried out in the County and will be incorporated into the plan update.

Status/Corresponding 2015 Strategy: BC18

Strategy P-27: Continue to support beach municipalities in maintenance/protection of beaches as well as protecting shorelines under County jurisdiction.

Progress: Brunswick County maintains a general statement of support regarding shoreline stabilization efforts; however, specific solutions and associated cost considerations will be specifically addressed by each relevant barrier island community participating in this plan update.

Status/Corresponding 2015 Strategy: BC19

Strategy P-28: Continue to require 404 wetlands and 100-year floodplain areas to be delineated on all preliminary subdivision plats for lands within and adjacent to the proposed subdivision.

Progress: The County, as well as all participating municipal jurisdictions, continues to support and enforce all US Army Corps of Engineers 404 Wetland Regulations.

Status/Corresponding 2015 Strategy: BC20

Strategy P-29: Develop a tree preservation ordinance that will address the following: – Increase buffering along areas of deforestation or clear cutting; – Provide vegetative medians as a best management plan as highways are expanded or improved when feasible; – Educate the public of the benefits of controlled burns on "natural areas" by certified professional foresters.

Progress: This strategy has been completed through development of the County Unified Development Ordinance.

Status/Corresponding 2015 Strategy: Completed

Strategy P-30: Continue to undertake the following actions to support maintenance of safe hurricane evacuation routes: – Identify and support improvements to roads that serve as hurricane evacuation routes; – Perform routine bridge and culvert maintenance, and raise bridges over streams that have documented flooding during significant rain events; – Support the planning and implementation of regional roadways; – Support the construction of a second Oak Island bridge, and new bridge for Sunset Beach and the Southern Bridge for the Cape Fear River.

Progress: The County continues to work with NCDPS, NCDOT, and all participating municipalities to assure that evacuation routes are effective, maintained and relayed to the public in an effective manner. This is reflected through the plan update.

Status/Corresponding 2015 Strategy: BC21

Strategy P-31: Support development within areas susceptible to sea level rise, shoreline erosion, and/or wetland loss which takes into consideration such conditions upon initial development. In the event such development is later threatened by shoreline loss, the County shall support the AEC use standards governing shoreline protection and management.

Progress: This strategy has been eliminated in response to the current state mandated prohibition on directly addressing sea level rise through plans and/or public policy documents and studies.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-32: Continue to support the installation of properly engineered and permitted bulkheads to protect against erosion and sea level rise.

Progress: This strategy has been eliminated in response to the current state mandated prohibition on directly addressing sea level rise through plans and/or public policy documents and studies.

Status/Corresponding 2015 Strategy: Eliminated

Strategy P-33: Continue to support the US Army Corps of Engineers' regulations, the applicable guidelines of the Coastal Area Management Act, and the use of local land use ordinances to regulate development of fresh water swamps, marshes, and 404 wetlands.

Progress: The County, as well as all participating municipal jurisdictions, continues to support and enforce all US Army Corps of Engineers 404 Wetland Regulations, CAMA Coastal Development Regulations and all other Federal, State and local regulations aimed at protecting the environmental quality of swamps and wetlands.

Status/Corresponding 2015 Strategy: BC22

Strategy P-34: Support the relocation of structures endangered by erosion, if the relocated structure will be in compliance with all applicable policies and regulations.

Progress: The County, in collaboration with all participating barrier island beach communities, continues to support and relocate when feasible structures imminently threatened by shoreline erosion.

Status/Corresponding 2015 Strategy: BC23

Strategy P-35: Continue to enforce the Brunswick County floodplain ordinance and participate in the National Flood Insurance Program. Subdivision regulations will be enforced – requiring elevation monuments to be set so that floodplain elevations can be more easily determined.

Progress: The County, as well as all participating jurisdictions, reviews and updates their respective Flood Damage Prevention Ordinances as deemed necessary, or when mandated by NCDPS and/or FEMA through the NFIP. Additionally, all existing locally adopted Base Flood Elevation standards will be maintained.

Status/Corresponding 2015 Strategy: BC24

Strategy P-36: Continue to support the guidelines of the Coastal Area Management Act and the efforts and programs

of the NC Department of Environment and Natural Resources, Division of Coastal Management, and the Coastal Resources Commission to protect the coastal wetlands, estuarine waters, estuarine shorelines, and public trust waters of Brunswick County.

Progress: The County, as well as all participating municipal jurisdictions, continues to support and enforce all US Army Corps of Engineers 404 Wetland Regulations, CAMA Coastal Development Regulations and all other Federal, State and local regulations aimed at protecting the environmental quality of swamps and wetlands.

Status/Corresponding 2015 Strategy: BC25

Strategy PP-1: Continue to acquire destroyed or substantially damaged properties and relocate households. Seek Federal and State funding (voluntary program). (CRS 520/420)

Progress: The County has not acquired any substantially damaged properties over the last five year planning period. The County, in collaboration with participating municipal jurisdictions, will continue pro-actively treating threatened residential structures as defined through the updated strategies.

Status/Corresponding 2015 Strategy: BC26

Strategy PP-2: Integrate publicly acquired land into public park and greenway systems. (CRS 420)

Progress: The County has not acquired any new land to be dedicated to public/open space use over the last five year planning period. Brunswick County will maintain a policy of acquiring land or accepting land gifts/donations in an effort to expand upon the County's greenway system.

Status/Corresponding 2015 Strategy: BC27

Strategy PP-3: Consider establishing an involuntary program to acquire properties susceptible to flood damage. (CRS 420/510)

Progress: This strategy has been eliminated through this update due to a lack of political will regarding this issue.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PP-4: Identify properties for potential public acquisition and establish a list of priority properties for acquisition following subsequent natural disasters.

Progress: This strategy was deemed redundant to strategy BC26 defined through the plan update; therefore, Strategy PP-4 has been eliminated.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PP-5: Consider establishing a program for purchase of development rights for floodplain properties. (CRS 420) (Possible partial or full tax deduction for charitable donation by property owner(s)).

Progress: This strategy has been eliminated due to the fact that the transfer of development rights are not legislatively enabled in North Carolina.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PP-6: Require residential construction to meet latest wind-resistance standards; encourage replacement of double-wide garage doors to improve wind resistance.

Progress: Strategies PP-6 through PP-10 all deal with standards and regulations established under the NC State Building Code. The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required.

Status/Corresponding 2015 Strategy: BC28

Strategy PP-7: Require new masonry chimneys >6' above roof to have continuous vertical reinforcing steel to help resist high winds. Retrofit existing chimneys.

Progress: Strategies PP-6 through PP-10 all deal with standards and regulations established under the NC State Building Code. The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required.

Status/Corresponding 2015 Strategy: BC28

Strategy PP-8: Ensure doorframes are securely anchored; especially double doors that can be very dangerous in high winds.

Progress: Strategies PP-6 through PP-10 all deal with standards and regulations established under the NC State Building Code. The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required.

Status/Corresponding 2015 Strategy: BC28

Strategy PP-9: Make sure that architectural features are designed, manufactured and installed to limit wind-borne debris.

Progress: Strategies PP-6 through PP-10 all deal with standards and regulations established under the NC State Building Code. The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required.

Status/Corresponding 2015 Strategy: BC10, BC28

Strategy PP-10: Encourage use of wind-resistant construction techniques used in coastal regions.

Progress: Strategies PP-6 through PP-10 all deal with standards and regulations established under the NC State Building Code. The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required.

Status/Corresponding 2015 Strategy: BC28

Strategy PP-11: Consider a policy for contractors to pick up building material and building debris prior to coastal storms.

Progress: Brunswick County promotes and carries out actions related to post-disaster debris management for homeowners and contractors through the County's Emergency Operations Plan. The County will continue to maintain a policy of educating and promoting the removal of construction materials from building sites prior to approaching coastal storm events.

Status/Corresponding 2015 Strategy: BC29

Strategy PP-12: Continue to enforce minimum housing code to require the improvement of substandard housing.

Progress: The County, as well as participating municipal jurisdictions, continues to maintain and enforce minimum housing code standards in an effort to maintain a stable housing stock.

Status/Corresponding 2015 Strategy: BC30

Strategy NR-1: Continue providing density credits for developments that establish perpetual easements for ecologically sensitive lands.

Progress: This strategy has been incorporated into the Brunswick County Unified Development Ordinance, and will be maintained through this plan update.

Status/Corresponding 2015 Strategy: BC31

Strategy NR-2: Enhance and develop new public accesses to waterway resources in a manner as to protect sensitive environment areas from development and implement the priority recommendations contained in the Brunswick County Shoreline Access Plan Update.

Progress: Over the last five years, Brunswick County has not established any new public access sites. The County in collaboration with participating municipal jurisdictions will continue to pro-actively seek out opportunities to increase public access sites. These efforts will focus on portions of the County deemed to be either environmentally sensitive or located within defined high hazard areas.

Status/Corresponding 2015 Strategy: BC32

Strategy NR-3: Continue to implement policies/programs that protect and maintain wetlands.

Progress: The County, as well as all participating municipal jurisdictions, continues to support and enforce all US Army Corps of Engineers 404 Wetland Regulations, CAMA Coastal Development Regulations and all other Federal, State and local regulations aimed at protecting the environmental quality of swamps and wetlands. This strategy was considered redundant to strategy P-36 above and was eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ES-1: Improve Hazard Warning and Response Plan (warning and evacuating critical facilities, getting persons out of floodprone or isolated areas, controlling vehicles on evacuation routes, evacuation of hazard materials). (CRS 610)

Progress: Brunswick County Emergency Management continues to annually review and, when necessary and practicable, improve upon existing Hazard Warning and Response Plans associated with the County Emergency Operations Plan.

Status/Corresponding 2015 Strategy: BC33

Strategy ES-2: Continue and expand the program to retrofit schools and other public facilities to serve as emergency shelters.

Progress: Brunswick County Emergency Management continues to work closely with NCDPS and the American Red Cross to expand upon the County's existing sheltering inventory. These efforts not only work towards increasing the number of facilities, but also the suitability and effectiveness of existing shelters.

Status/Corresponding 2015 Strategy: BC34

Strategy ES-3: Use State grant funds to retrofit public properties as shelters.

Progress: The County has been unable to secure grant funds to retrofit public facilities as shelters. Due to this fact, this strategy is being eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ES-4: Provide training for "first responders" in identifying and reporting opportunities to mitigate the effects of future disasters.

Progress: The County has pro-actively addressed this strategy through annual implementation of the County EOP. The first responders receive training on an ongoing basis in accordance with state regulations.

Status/Corresponding 2015 Strategy: BC35

Strategy ES-5: Work with industry to develop emergency response plans for specific industries and ensure that all plans are fully coordinated with County emergency management plans.

Progress: The County works closely with municipalities and the business community to expand preparedness training beyond the scope of local government staff and first responders. These efforts are carried out by local public safety officials and the County Local Emergency Planning Committee (LEPC).

Status/Corresponding 2015 Strategy: BC36

Strategy ES-6: Ensure adequate evacuation time in case of major hazard event.

Progress: Brunswick County Emergency Management works closely with NCDOT and NCDPS through annual EOP updates and exercises to ensure that all defined evacuation routes can handle projected capacities.

Status/Corresponding 2015 Strategy: BC37

Strategy ES-7: Evaluate areas with limited evacuation capacity and pursue methods of improving capacity.

Progress: Brunswick County Emergency Management works closely with NCDOT and NCDPS through annual EOP updates and exercises to ensure that all defined evacuation routes can handle projected capacities.

Status/Corresponding 2015 Strategy: BC37

Strategy ES-8: Protect new critical facilities by floodproofing or locating outside the 500-year floodplain.

Progress: This strategy was deemed vague and redundant to other strategy statement defined throughout the existing plan and was eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ES-9: Establish program for evaluation and improvements of critical services and facilities.

Progress: This strategy was deemed vague and redundant to other strategy statement defined throughout the existing plan and was eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ES-10: Evaluate flood or access problems for critical facilities; develop recommendations for protecting critical facilities. Identify alternative command posts.

Progress: This strategy was deemed vague and redundant to other strategy statement defined throughout the existing plan and was eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy S-1: Continue debris removal program to correct problem sites.

Progress: The County, as well as all participating municipal jurisdictions, continues to maintain contracts with pre-qualified disaster debris management companies. These contractors assist the County, in collaboration with NCDPS and NCDENR, in identifying and certifying appropriate disposal sites.

Status/Corresponding 2015 Strategy: BC38

Strategy S-2: Continue to support the dredging of waterways to improve function and water quality.

Progress: This strategy was removed through this update. The statement was deemed arbitrary and lacked adequate justification and/or direction.

Status/Corresponding 2015 Strategy: Eliminated

Strategy S-3: Continue to maintain/enforce an overall cap of 5% on post development stormwater discharge increase over pre-development conditions.

Progress: This strategy continues to be maintained and enforced through the County Stormwater Management Ordinance required through the NPDES Phase II Stormwater Management Program.

Status/Corresponding 2015 Strategy: BC39

Strategy S-4: Continue to enforce and strengthen the County appearance code concerning removal of potential

projectiles/debris such as junked motor vehicles and mobile homes, and dilapidated housing.

Progress: The County continues to maintain a nuisance and debris management code; however, this program was not deemed an effective mitigation measure. Addressing nuisance issues within unincorporated portions of the County is very difficult to effectively accomplish.

Status/Corresponding 2015 Strategy: Eliminated

Strategy S-5: Continue to provide funding support for the artificial reef program.

Progress: This strategy has been eliminated due to a lack of political will under the County's current administration.

Status/Corresponding 2015 Strategy: Eliminated

Strategy S-6: Continue to support efforts to place spoil materials from channel maintenance and dredging on Brunswick County beaches, including each of the incorporated municipalities, as warranted.

Progress: The County, as well as all coastal beach communities, continues to strongly support the US Army Corps of Engineers policy of depositing channel maintenance dredge spoils on adjacent beachfront communities.

Status/Corresponding 2015 Strategy: BC40

Strategy S-7: Section 206 Lower Lockwood Folly River Aquatic Habitat Restoration Project. (Removal of sediment bars to increase tidal flushing and improve aquatic habitat.)

Progress: Brunswick County continues to support the activities and funding associated with this project aimed at habitat restoration along the Lockwood Folly River. This effort not only serves to improve environmental conditions, but also bolster the wetland as an additional buffer against storm surge and excessive riverine flooding.

Status/Corresponding 2015 Strategy: BC41

Strategy S-8: Complete phase-in of EPA Phase II requirements.

Progress: The County continues to maintain its NPDES Phase II Stormwater permit by carrying out all activities defined under the program. This permit will continue to be updated on a five year cycle.

Status/Corresponding 2015 Strategy: BC42

Strategy PI-1: Develop a tracking system to evaluate progress and revise mitigation activities as necessary. Track benefits in flood loss reduction.

Progress: This strategy has been eliminated primarily due to the fact that this process is clearly spelled out within the context of Section 7 of the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PI-2: Produce an annual progress report on how well the plan is being implemented – send the report with

the annual CRS re-certification and submit a copy to NC Division of Emergency Management.

Progress: This strategy has been eliminated primarily due to the fact that this process is clearly spelled out within the context of Section 7 of the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PI-3: Establish a 5-year schedule for reviewing and updating the hazard mitigation plan.

Progress: This strategy has been eliminated primarily due to the fact that this process is clearly spelled out within the context of Section 7 of the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PI-4: Preliminary mapping of the Lumber River Basin has been completed and is under review for adoption. The Cape Fear River Basin mapping is ongoing. Review of the preliminary maps can be viewed at www.ncfloodmaps.com.

Progress: The County, as well as all participating municipal jurisdictions, will review and ultimately adopt updated Flood Insurance Rate Maps as they are prepared and provided through the NC/FEMA National Flood Insurance Program. These efforts will also potentially involve updates to the County and Municipal Flood Damage Prevention Ordinances.

Status/Corresponding 2015 Strategy: BC9, BC24, BC43

Strategy PI-5: Incorporate new FEMA digital FIRMs into the County GIS. (CRS 320)

Progress: As new FIRM's are developed and adopted, the updated maps are incorporated into County and municipal GIS systems. Updated FIRM's will also be available through the NCONE Mapping Service.

Status/Corresponding 2015 Strategy: BC43

Strategy PI-6: Develop and implement a hazard awareness program (elevation certificates, FIRM data, bulletin on property protection measures and flood insurance, etc.) that is available through the County's website www.brunsco.net. (CRS 310/320/330/340/440)

Progress: This strategy was deemed redundant to other activities and strategy statements provided throughout the updated County-wide strategies table. Due to this fact, it has been eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy PI-7: Establish locations for flood awareness signs – shown elevations of high water during/after Hurricane Floyd, the base flood, and the base flood plus 2'. Signs should be surveyed to serve as elevation reference marks.

Progress: The County will attempt to make this a higher priority over through the implementation of this plan update. Locating signage regarding historical flood levels provides a reminder to local citizens about the dire consequences associated with hurricanes and associated tropical storm events.

Status/Corresponding 2015 Strategy: BC44

Strategy PI-8: Expand efforts to disseminate flood insurance rate maps to realtors, developers, financial institutions, and insurance agencies.

Progress: The County, as well as participating municipalities, continue to work closely with real estate agents, contractors and developers in an effort to educate potential property owners about the dangers associated with development in defined flood hazard areas.

Status/Corresponding 2015 Strategy: BC45

Strategy PI-9: Early Warning Systems/Dissemination of information regarding need to seek shelter in safe room when high winds expected.

Progress: The County maintains and annually reviews the effectiveness of its early warning system. This system is utilized to provide accurate and up to date notifications about rapidly changing and severe weather conditions impacting the County and region overall.

Status/Corresponding 2015 Strategy: BC46

Strategy PI-10: Establish and maintain retrofitting techniques and publicize in the public libraries, and also through citizen newsletters. (CRS 330/350/360)

Progress: The County in collaboration with municipal jurisdictions continues to provide information regarding techniques for retrofitting structures subject to repetitive flooding associated with natural hazard events. These materials are available in local planning and inspections offices, as well as all public library facilities.

Status/Corresponding 2015 Strategy: BC47

Strategy PI-11: Cooperate with local, state, and federal efforts to inform the public of the anticipated effects of sea level rise.

Progress: This strategy has been eliminated in response to the current state mandated prohibition on directly addressing sea level rise through plans and/or public policy documents and studies.

Status/Corresponding 2015 Strategy: Eliminated

Village of Bald Head Island

Strategy BHI #1: Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA). All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined special flood hazard area without the submittal of the required elevation certificate.

Progress: The Village of Bald Head Island has required and maintained elevation certificates for all structures developed within the flood hazard area. This requirement will continue, but is now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative

efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC14

Strategy BHI #2: Maintain a map information service involving the following: • Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including providing information on whether a given property is located in a flood hazard area; • Provide information regarding the flood insurance purchase requirement; • Maintain historical and current FIRMs; • Advertise the availability of the map information service once annually in the local newspaper; • Provide information to inquirers about local floodplain management requirements.

Progress: The Village's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal
jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy BHI #3: The Village of Bald Head Island will once annually mail a notice to all property owners whose land is located within a special flood hazard area. The notice should clearly state that the recipient's property is susceptible to flooding and provide information pertinent to emergency evacuation and post-disaster recovery. Additionally, the Village will notify all property owners once annually via mail, either through individual mailers or utility bill inserts, of the hazards associated with flooding and other hazards resulting from severe weather events. The Village Development Services Department will hold one training outreach seminar annually to educate builders, contractors, engineers, and architects about the latest methods available for property protection and development best management practices associated with floodplain development.

Progress: Over the last five years, the Village has direct mailed all properties located within the flood hazard area. This strategy will continue to be carried out as a component of the Village's CRS program.

Status/Corresponding 2015 Strategy: B1, BC48

Strategy BHI #4: The Village will work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The Village will provide these agencies with brochures documenting the concerns relating to development located within flood prone areas and ways that homeowners may make their homes more disaster resistant to strong winds, lightning, and heavy rains.

Progress: The County, as well as participating municipalities, continue to work closely with real estate agents, contractors and developers in an effort to educate potential property owners about the dangers associated with development in defined flood hazard areas. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy BHI #5: The Village will make information regarding hazards and development regulations within floodplains available through the following actions: • The Village of Bald Head Island Building Inspector will ensure that the local library maintains information relating to flooding and flood protection; • The Village will provide a link on their website to FEMA resources addressing flooding and flood protection; • The Village will maintain information pertinent to local development conditions and make this information readily available to the public, as well as at the local library.

Progress: The Village's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches

and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy BHI #6: The Village Development Services Department will provide comprehensive services regarding planning and development activities within the defined SFHA and issues relating to the construction of disaster resistant structures. These services will include the following: • Provide site-specific flood and flood related information on an as-needed basis; • The Development Services Department will maintain a list of contractors with experience in floodproofing and retrofit techniques; • Provide information on methods of wind proofing constructions methods for new and renovated structures; • Maintain materials providing an overview of how to select a qualified contractor; • Make site visits upon request to review occurrences of flooding, drainage problems, and sewer problems. If applicable to inspector should provide one-on-one advice to the property owner; • Provide advice and assistance regarding CRS activity 530 (Flood Protection); • Advertise the availability of this service once annually in the local newspaper; • Maintain a log of all individuals assisted through this service including all site visits.

Progress: The Village's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, Table 6-5 (page 6-40)

Strategy BHI #7: The Village will continue to support the NC Floodplain Mapping Program in its efforts to provide accurate and up-to-date Flood Insurance Rate Maps. This effort will also provide support the State's efforts as an NFIP Cooperating Technical Partner.

Progress: The Village has reviewed and adopted recently updated FIRM maps. This process also resulted in the revision and adoption of an updated Flood Damage Prevention Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9, BC24

Strategy BHI #8: The Village will continue to support the Bald Head Island Conservancy and the Smith Island Land Trust in their efforts to acquire land for open space preservation. It is the Village's desire that these properties be deed restricted and maintained in their natural state.

Progress: Over the last five years, the Village has supported the efforts of the Bald Head Island Conservancy and the Smith Island Land Trust. These efforts have resulted in 6 parcels being dedicated and preserved as open space in perpetuity.

Status/Corresponding 2015 Strategy: BC54

Strategy BHI #9: The Village of Bald Head Island will continue to enforce CAMA coastal development regulations. The Village will continue to maintain a Certified Floodplain Manager on staff to review all site plans for development occurring within a flood hazard area.

Progress: The Village has pro-actively enforced all state and locally adopted CAMA rules over the last five years through coordination with NCDEQ. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC25

Strategy BHI #10: The Village will maintain a comprehensive Geographic Information System (GIS) with current FIRM panels in an effort to make this information readily available to Village citizens. In addition to this digital data, bound copies of all historical and current FIRM panels will be maintained within the Development Services Department.

Progress: As new FIRM's are developed and adopted, the updated maps are incorporated into County and municipal GIS systems. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9, BC24

Strategy BHI #11 : The Village will continue to enforce NCDENR Sedimentation and Erosion Control Standards, as well as other rules and regulations aimed at protecting water quality. The Village will continue to implement the proposed projects outlined within the Village Comprehensive Stormwater Management Plan. This plan is a phased effort, and will continue to be developed and implemented over the next five years through the implementation of this plan.

Progress: The Village has pro-actively enforced all state and locally adopted Sedimentation and Erosion Control standards over the last five years through coordination with NCDEQ. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC25

Strategy BHI #12: The Village of Bald Head Island will work on the five-year implementation of this plan. At the end of this five-year period, the Village will undertake efforts to update this plan.

Progress: This strategy is being carried out through the current planning process. This strategy will be eliminated and addressed through language outlined in Section 7.

Status/Corresponding 2015 Strategy: Eliminated

Strategy BHI #13: The Village of Bald Head Island will continue to maintain an early warning system relating to notifications regarding flooding and other man-made disasters. This effort should involve all citizens and visitors, as well as the Village's critical infrastructure system.

Progress: The Village has maintained an early warning system over the last five years. This strategy will continue through local emergency management procedures.

Status/Corresponding 2015 Strategy: BC55

Strategy BHI #14: The Village will continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state as well as the State of North Carolina. The Village will coordinate with the state agency to ensure that all dam facilities, both public and private, are properly maintained and stable.

Progress: The Village has supported the efforts of the NC Office of Dam Safety through implementation of the Village's CRS program. The County will continue to maintain this policy as a component of the Village's CRS program.

Status/Corresponding 2015 Strategy: Table 6-5 (page 6-40)

Strategy BHI #15: The Village of Bald Head Island will consider participation in the CRS Program.

Progress: This strategy has not been accomplished; however, the Village will consider joining through implementation of this update.

Status/Corresponding 2015 Strategy: BC7, Table 6-5 (page 6-40)

Strategy BHI #16: The Village will continue to monitor potable water resources locally, as well as statewide. When necessary the Village will institute measures to conserve water resources according to the existing Water Shortage Response Plan.

Progress: The Village has pro-actively enforced the local water shortage response ordinance over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy BHI #17: The Village will continue to monitor coastal erosion along the shoreline located within the Village's corporate limits and work towards short and long-term solutions to this issue. This

effort will involve cooperation with the US Army Corps of Engineers, as well as other state and federal permitting agencies.

Progress: This strategy has been eliminated in an effort to better reflect the Village's current policy regarding shoreline stabilization and management.

Status/Corresponding 2015 Strategy: Eliminated

Strategy BHI #18: The Village of Bald Head Island will review all land development controls in an effort to identify ways to reduce urban fire risk throughout the Village's corporate limits. Additionally, the Village will continue to enforce its open burning ban.

Progress: This strategy has been enforced through regulations defined in the Village's local zoning regulations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC52

Town of Belville

Strategy Belville P-1: At the next update of the CAMA Land Use Plan, consider strategies that place restrictions on new development and redevelopment in high hazard areas such as those areas adjacent to the Brunswick River.

Progress: This strategy has not been carried out by the Town. The actions defined under this locally specific strategy statement will be completed through implementation of this update, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Belville P-2: Continue to support Brunswick County in enforcing the NC State Building Code.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Belville P-3: Continue to support Brunswick County in recording and maintaining all tax parcel information and floodplain locations in the GIS system.

Progress: As new FIRM's are developed and adopted, the updated maps are incorporated into County

and municipal GIS systems. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy Belville P-4: Consider developing a Floodplain Management Plan to better assist citizens in the event of such a disaster.

Progress: Belville has developed, adopted, and is enforcing a current Flood Damage Prevention Ordinance (FDPO). The Town will utilize this Regional Mitigation Plan update as a solution to drafting a Flood Management Plan.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Belville P-5: Support Brunswick County in participation in the Community Rating System (CRS).

Progress: Although Belville is not currently a participating CRS community, the Town has supported these efforts and will continue to do so. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC7

Strategy Belville P-6: In order to reduce stormwater runoff, the Town will study ways to mitigate runoff and consider incorporating new standards in Town ordinances.

Progress: The Town has established and enforces a range of stormwater and sedimentation controls aimed at protecting water quality. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC39, BC42

Strategy Belville P-7: The Town will consider making amendments to Town ordinances to prohibit gas stations and junkyards in special flood hazard areas.

Progress: This strategy was completed and will be eliminated through this plan update. The Town will review zoning standards on an annual basis, in an effort to minimize development in flood hazard areas.

Status/Corresponding 2015 Strategy: BC10

Strategy Belville PP-1: Monitor, in public areas, the removal of trees and branches at risk of breaking or falling in wind, ice, and snow storms.

Progress: This strategy is addressed through implementation of the County Emergency Operations Plan.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Belville PP-2: The Town will consider developing a database of existing properties that have received damage due to natural disasters. This database will provide an assessment of properties that have the potential for future damage due to natural disasters.

Progress: The Town has not maintained its efforts to establish this database over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13, BC17

Strategy Belville NR-1: The Town will consider incorporating shoreline vegetation protection buffers along Areas of Environmental Concern and along canals in order to protect land character and to help mitigate flooding.

Progress: The Town has enforced these standards through the Town's local CAMA Land Use Plan in conjunction with CAMA coastal development regulations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC25

Strategy Belville ES-1: Continue to make available to the public information in regards to the Brunswick County Emergency Management Response Plan, including the Town of Belville, available for public review at Town Hall.

Progress: The Town of Belville has maintained local Emergency Management procedures on the Town website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of
collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, R2

Strategy Belville ES-2: Keep a copy of the Brunswick County Multi-Jurisdictional Hazard Mitigation Plan, including the Town of Belville, available for public review at Town Hall.

Progress: The Town has maintained a copy of the current Brunswick County Multi-Jurisdictional Hazard Mitigation Plan at Town Hall, as well as on the Town's website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language

presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Belville ES-3: Work with Brunswick County officials to distribute materials about the County Water Shortage Response Plan.

Progress: The County has pro-actively enforced and educated the public about the Water Shortage Response Plan over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Belville ES-4: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. In addition, develop a list of providers of emergency equipment.

Progress: The Town in collaboration with Brunswick County Emergency Management have maintained this strategy over the last five years. These efforts will continue through annual procedures defined int the County EOP. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Belville ES-5: To improve road visibility during hazardous road conditions, encourage NCDOT to place new reflector tape or paint along road edges and in the dividing line on all major roads in the Town.

Progress: The Town in collaboration with other participating County jurisdictions have worked closely with NCDOT to carry out this strategy. Some progress has been made but efforts will continue through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed
through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Belville ES-6: The Town will continue to work with other governmental bodies including Brunswick County and surrounding communities to provide for a continued supply of pure, potable water.

Progress: The Town has collaborated with local water and sewer districts to maintain a clean potable

water supply. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Belville ES-7: Maintain fire event preparedness.

Progress: The Town has carried out implementation of this strategy through the County EOP and local volunteer fire department efforts. Additionally, the NC State Forest assists in fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Belville ES-8: Ensure the fire hydrants are working properly.

Progress: This strategy has been carried out through annual public works routine maintenance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Belville PI-1: Participate with Brunswick County in a hazard mitigation seminar for community residents, including information on preparedness for all hazards significant to Brunswick County, including the Town of Belville.

Progress: The Town has participated in this seminar as made available through Brunswick County Emergency Management. These seminars are typically held leading into hurricane season. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language
presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Belville PI-2: Provide home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at Town Hall and other community owned public facilities.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include

guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

City of Boiling Spring Lakes

Strategy BSL PI-1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a City-sponsored workshop.

Progress: The City's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy BSL PI-2: Hold a City-sponsored hazard mitigation seminar for the community residents, including information on preparedness, mitigation, and response for all hazards significant to Boiling Spring Lakes.

Progress: This strategy will now be carried out as a component of the County's Emergency Operations Plan.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy BSL PI-3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the City hall and other community owned, public facilities in City.

Progress: The City's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy BSL PI-4: Manually disperse and post information at City Hall which provides information about the City's Emergency Response Plan and relevant emergency response actions the public can take. Also ensure each City department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The City maintains comprehensive information regarding land development regulations, emergency response procedures, and public safety programs and initiatives. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy BSL PI-5: Manually disperse and post information at City Hall which provides information about the City's Community-Based Hazard Mitigation Plan and relevant mitigation measures that public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: This effort has not been accomplished; however, the City intends to achieve this strategy through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy BSL PI-6: The City should publicize, at the City Hall, maps of evacuation routes which will facilitate the evacuation of Boiling Spring Lakes in case of a hazardous event.

Progress: The City has maintained this information on the city website over the five year implementation of the 2011 plan. The actions defined under this locally specific strategy statement will continue, but are now

addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC21

Strategy BSL PI-7: The City should distribute via gas/electric bills maps of evacuation routes which will facilitate the evacuation of Boiling Spring Lakes in case of a hazardous event.

Progress: The City has not direct mailed this information over the last five years. The City will rely on the County Emergency Management as a means to disseminate these maps and information to residents and visitors. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, B21

Strategy BSL PI-8: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: Over the last five years, Boiling Spring Lakes has collaborated with County utility districts to educate businesses and property owners about the terms and potential restrictions associated with local water shortage response plans. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B53

Strategy BSL P-1: Continue to update the City's Emergency Response Plan on an annual basis. The Emergency Response Plan should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: The City has participated in Emergency Operations efforts at the local and County level over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy BSL P-2: Maintain evacuation routes in the event of a hazardous event.

Progress: The City has worked closely with Brunswick County Emergency Management and NCDOT to maintain and mark evacuation routes. The actions defined under this locally specific strategy statement will
continue, but are now addressed through updated language presented in the County-wide Mitigation

Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC21

Strategy BSL P-3: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The City's Public Works department has worked closely with Brunswick County Emergency Management to monitor and maintain backup generators. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy BSL P-4: Purchase, as necessary, backup generators as determined by the results of Action P-3.

Progress: No additional backup generators or quick connects were acquired over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy BSL P-5: Install, as necessary, generator quick connects, as determined by the results of Action P-3.

Progress: No additional backup generators or quick connects were acquired over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy BSL P-6: Continue to enforce the International Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Code.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will
continue, but are now addressed through updated language presented in the County-wide Mitigation

Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy BSL P-7: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the City.

Progress: The City's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy BSL P-8: The City will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The City has carried out this strategy through enforcement of the City's Minimum Housing Code. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC30

Strategy BSL P-9: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the City's capability to generate maps when needed.

Progress: Over the last five years, Brunswick County, in collaboration with all participating municipalities, worked to expand upon and improve the quality of county-wide GIS data. The County will continue to work closely with municipalities to establish and maintain a robust and comprehensive GIS system. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy BSL P-10: Develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should also include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the City to easily identify properties at high risk of damage from certain hazards as well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information, the City should send a survey to all

residents requesting information that should be included in the database.

Progress: The City has not been diligent in carrying out this strategy. These efforts will continue in conjunction with the County GIS. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy BSL P-11: The zoning and subdivision ordinances should be revised to utilize the use of various pervious surfaces in parking lots in recreational areas near the floodplain..

Progress: This strategy has not been carried out due to a lack of political will. It will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy BSL P-12: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Boiling Spring Lakes Emergency Response Plan as it relates to the expectations of the City's water supplier.

Progress: The City completed and adopted a Water Shortage Response Plan in 2008; enforcement will continue through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy BSL P-13: The City should continue their proactive approach to mitigation by connecting Rainwater Retention Drums to the downspouts of each gutter system on every municipal building within Boiling Spring Lakes. The collected water should be used to irrigate all municipal gardens, parks, lawns, and the like.

Progress: This strategy has been eliminated due to a lack of political will and available funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy BSL P-14: Storms can create hazardous road conditions, including decreased ability for drivers to see road boundaries. To improve road visibility, encourage the Department of Transportation to place new reflector tape or paint along road edges and in the dividing line should be placed on all major roads throughout City.

Progress: The City in collaboration with other participating County jurisdictions have worked closely with NCDOT to carry out this strategy. Some progress has been made but efforts will continue through this plan update. The actions defined under this locally specific strategy statement will continue, but are

now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy BSL P-15: Continue to encourage proper waste disposal and recycling. In order to protect the vulnerable aquifer from contamination, the City should do all it can to prevent seepage of wastes and toxic elements into the ground. Proper disposal of waste and recycling when possible will aid in this effort. This measure may be implemented through a City policy or through public education measures.

Progress: This strategy was deemed a day-to-day function of the City, and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy BSL P-16: The zoning ordinance should be amended to prohibit underground chemical and gasoline storage, as set forth by EPA and the International Building Code, in an effort to minimize risks to groundwater resources.

Progress: This strategy was completed in 2009. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy BSL P-17: Regulate storage of toxic wastes. The zoning ordinance should be amended to prohibit the storage of toxic wastes within the planning jurisdiction.

Progress: This strategy was completed in 2009. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy BSL P-18: The City shall work with other appropriate governmental bodies, namely Brunswick County to provide for a continued pure supply of potable water.

Progress: The City has collaborated over the last five years with local water utilities to ensure access to a safe potable water supply. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This
change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy BSL P-19: Maintain fire event preparedness. The fire department has the responsibility to assure the City's protection during fire events. Part of this responsibility is dependent upon the department's ability to maintain the materials and a knowledge base for addressing such an event. This responsibility must be supported by provision of adequate funding for the continuing education and materials necessary to maintain this preparedness.

Progress: The City has worked diligently with Brunswick County Emergency Management to prepare for and respond to fire events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy BSL P-20: Explore and seek access to all potential sources of information and communication regarding early fire prevention.

Progress: The City has worked diligently with Brunswick County Emergency Management to prepare for and respond to fire events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy BSL P-21: Evaluate and improve fire fighting procedures.

Progress: The City has worked diligently with Brunswick County Emergency Management to prepare for and respond to fire events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy BSL P-22: Ensure the fire hydrants are working properly.

Progress: The City Public Works department, in coordination with local fire officials, inspect all town fire hydrants for proper functioning. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies
(Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy BSL P-23: Maintain hazardous materials event preparedness. The City should develop a plan of

action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the county till the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The City's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of hazardous materials. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Strategy BSL P-24: Maintain nuclear event preparedness. The City should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness. This may be made part of the City's Emergency Response Plan.

Progress: The City's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Strategy BSL ES-1: Develop a tornado warning system. Several options exist for a tornado warning system. The most feasible for Boiling Spring Lakes would be to develop a siren to warn of oncoming tornados. This siren would have to differentiate from the fire alarm and be well publicized for citizens to recognize.

Progress: This strategy has not been achieved. Moving forward, early warning efforts will be handled through Brunswick County Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC46

Strategy BSL NRP-1: Protect/Enhance Shoreline Vegetation. The City should revise its zoning and subdivision ordinance to incorporate shoreline vegetation protection buffers along the AEC's in order to protect the character and the help mitigate flooding.

Progress: This strategy was completed in 2006; enforcement has continued since this time. The actions defined under this locally specific strategy statement will continue, but are now addressed through

updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC25

Town of Bolivia

Strategy Bolivia P-1: Work with Brunswick County to set up program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (CRS 320)

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Bolivia P-2: Work with Brunswick County to ensure that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE). (CRS 430)

Progress: Over the last five years, the Town has steered development away from high hazard areas through enforcement of local zoning regulations and the Flood Damage Prevention Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3, BC9

Strategy Bolivia P-3: In cooperation with Brunswick County, continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services – fire, rescue, medical, etc.

Progress: The Town has not made improvements to any critical facilities over the last five years. The Town will continue to target opportunities as they arise or funding becomes available. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3, BC5

Strategy Bolivia P-4: Continue to address and strengthen approach to "scattered and sprawling, large lot subdivision activity," "unplanned commercial strip development," "sewage problems and sewage solutions," and "storm water runoff and drainage."

Progress: This strategy was completed through update and adoption of the County's Unified Development Ordinance within the last five years for areas surrounding the Town. Bolivia did not independently adopt any revised planning and zoning standards. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Bolivia P-5: Review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE. All substantially damaged buildings should be elevated to this level (CRS 430).

Progress: The Town has actively enforced local Flood Damage Prevention Ordinance provisions; however, the BFE has not been increased to two feet. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Bolivia P-6: Evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.

Progress: This strategy was completed through update and adoption of the County's Unified Development Ordinance within the last five years for areas surrounding the Town. Bolivia did not independently adopted any revised planning and zoning standards. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Town of Calabash

Strategy Calabash P-1: Update the Land Use Plan.

Progress: The Town completed a Land Use Plan update in 2012. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in

the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Calabash P-2: Revise/update Stormwater Management Ordinance.

Progress: The Town reviews and updates local stormwater controls on an as needed basis. No revisions were required over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Calabash P-3: Update the Town Zoning Ordinance.

Progress: The Town adopted updates zoning regulations in 2013. The Town will continue to revise these regulations as deemed necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Calabash P-4: Work with Brunswick County to enforce NC Building Codes for wind resistance.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Calabash P-5: Ensure Mobile/Manufactured Homes are installed and secured properly.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. All manufactured homes are tied down in accordance with NC State Building Code. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Calabash P-6: Consider revising Flood Damage Prevention Ordinance.

Progress: The Town revised the Flood Damage Prevention Ordinance in May 2010. The Town will continue to review the Flood Damage Prevention Ordinance annually and update it as deemed necessary and/or required by FEMA and NCDPS. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Calabash S-1: Work with Brunswick County to enforce debris removal program to correct problem sites.

Progress: This strategy is carried out as a component of the County's Emergency Operations Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B38

Strategy Calabash PI-1: Produce an annual progress report on the status of actions proposed in the HMP.

Progress: This strategy has been carried out through implementation of the Town's current HMP. Moving forward, this language is covered in Section 7 of this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Town of Carolina Shores

Strategy Carolina Shores 1.1.1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Carolina Shores 1.1.2: Post the plans on the Town's website.

Progress: The plan has been posted on the Town's website over the last five years. The existing plan will

be replaced with this update upon adoption. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Carolina Shores 1.1.3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the Town Hall and other community owned, public facilities in Town.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Carolina Shores 1.1.4: Include information in quarterly Town newsletter (via email and hand deliver to POA).

Progress: The Town has carried out this task annually over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented
in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Carolina Shores 1.2.1: Manually disperse and post information at the Town Hall which provides information about the Town's Emergency Response Plan and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town has worked closely with Brunswick County Emergency Management over the last five years in an effort to provide citizens with accurate information regarding natural hazards through Town Hall. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Carolina Shores 1.2.2: Manually disperse and post information at the Town Hall which provides information about the Town's Community-Based Hazard Mitigation Plan and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: Information regarding the Town's existing plan has been provided to residents over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5, BC46, BC48

Strategy Carolina Shores 1.3.1: Continue to update the Town of Carolina Shores Emergency Response Plan on an annual basis. The Emergency Response Plan should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: This strategy has been carried out over the last five years in concert with updates to the County Emergency Operations Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Carolina Shores 1.4.1: Maintain evacuation routes in the event of a hazardous event.

Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Carolina Shores 1.4.2: The Town should publicize, at Town Hall, maps of evacuation routes which will facilitate the evacuation of Carolina Shores in case of a hazardous event.

Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination

and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Carolina Shores 1.4.3: The Town should distribute via website and newsletter, maps of evacuation routes which will facilitate the evacuation of Carolina Shores in case of a hazardous event.

Progress: All evacuation routes have been mapped by the Brunswick County GIS department and are reviewed and updated annually as needed. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5, BC21

Strategy Carolina Shores 2.1.1: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Carolina Shores 2.1.2: Purchase as necessary backup generators as determined by the results of 2.1.1.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Carolina Shores 2.1.3: Purchase emergency supplies for 10 Town personnel who will man the emergency operations center during and following a disaster. This strategy will require the Town to establish a list of items necessary for each employee prior to purchase.

Progress: This strategy has not been accomplished. The Town will apply for funding to have this project completed as the opportunity arises. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide

Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Carolina Shores 2.1.4: Purchase 4 chain saws to assist in the removal of debris created during disaster events. Approximate cost of this project is $2000.

Progress: This strategy has been accomplished and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Carolina Shores 2.1.5: Purchase a tractor/backhoe for clearing.

Progress: This strategy has been accomplished and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Carolina Shores 2.2.1: Purchase hurricane shutters to place on the 12 windows in Town Hall during high wind events. It is necessary to protect Town Hall as much as possible as it is the emergency operations center for the Town during disaster response and recovery.

Progress: This strategy was not accomplished through implementation of the existing plan. The Town will continue to seek funding opportunities through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Carolina Shores 2.2.2: Purchase hurricane shutters to place on the window of the public works building during high wind events.

Progress: This strategy was not accomplished through implementation of the existing plan. The Town will continue to seek funding opportunities through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Carolina Shores 3.1.1: Continue to enforce the North Carolina State Building Codes. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the North Carolina State Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy

statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Carolina Shores 3.2.1: Monitor trees and branches in public areas at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Carolina Shores 3.3.1: The Town will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC30

Strategy Carolina Shores 4.1.1: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Town's capability to generate maps when needed. The Brunswick County GIS department currently completes their GIS mapping.

Progress: The Town has completed this strategy in conjunction with implementation of the existing plan.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Carolina Shores 4.2.1: Develop a database that identifies each property that has received damaged due to hazards identified within the mitigation plan. The database should also include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the Town to easily identify properties at high risk of damage from certain hazards and well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information the Town should send a survey to all residents requesting information that should be included in the database.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in

the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Carolina Shores 4.3.1: Purchase 5 Nextel radios to assign to all primary Town personnel.

Progress: This strategy has been accomplished and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Carolina Shores 4.3.2: Purchase 2-way radios as a backup for personnel, approximate cost is $5,000.

Progress: This strategy was not accomplished; however, the Town will continue to work closely with County Emergency Management regarding the issue of emergency communication.

Status/Corresponding 2015 Strategy: BC50

Strategy Carolina Shores 5.1.1: Revise the Zoning and Subdivision Ordinance to require the utilization of various pervious surfaces within the floodplain in order to reduce stormwater runoff. This should utilizing the use of various pervious surfaces in parking lots in recreational areas near the floodplain.

Progress: The Town has not accomplished this strategy; however, the Town will consider changes to land development regulations that will assist with mitigation efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Carolina Shores 5.1.2: Revise the existing special flood hazard area to reflect the areas flooded during Hurricane Floyd.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13, BC17

Strategy Carolina Shores 5.1.3: Identify all structures within the newly identified Special Flood Hazard area.

Progress: This strategy will be completed upon final adoption of updated FIRMs. The maps are currently under review by Brunswick County. The actions defined under this locally specific strategy

statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13, BC17

Strategy Carolina Shores 5.1.4: Implement program to acquire buildings located within the Special Flood Hazard area that have been substantially damaged by flood events.

Progress: No structures were acquired by the Town over the last five years. The Town will continue to address this issue following natural hazard events like the flooding of 2015. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC26

Strategy Carolina Shores 5.1.5: Implement program to elevate any buildings that are located within the Special Flood Hazard area in cases in which owners are not willing to relocate.

Progress: No structures were elevated by the Town over the last five years. The Town will continue to address this issue following natural hazard events like the flooding of 2015. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC26

Strategy Carolina Shores 6.1.1: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: This strategy has not been carried out independently by the Town. The Town has worked closely with Brunswick County Emergency Management to carry out this activity.

Status/Corresponding 2015 Strategy: BC53

Strategy Carolina Shores 6.1.2: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Carolina Shores Emergency Response Plan as it relates to the expectations of the Town's water supplier. Currently the Town follows the county's guidelines.

Progress: This effort was completed and will be implemented through future updates of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Carolina Shores 7.1.1: Develop a tornado and waterspout warning system.

Progress: This strategy has not been developed locally; however, it will be accomplished through annual EOP updates.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Carolina Shores 8.1.1: Maintain a current action plan for fire response.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Carolina Shores 8.2.1: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC50

Strategy Carolina Shores 8.2.2: Evaluate and improve fire fighting procedures.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC50, BC52

Strategy Carolina Shores 8.2.3: Ensure the fire hydrants are working properly.

Progress: The Town Public Works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally

specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Carolina Shores 9.1.1: Maintain HAZMAT event preparedness. The Fire Department should develop a plan of action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the County until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC49

Strategy Carolina Shores 10.1.1: Maintain nuclear event preparedness.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Town of Caswell Beach

Strategy Caswell Beach 1.1.1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Caswell Beach 1.1.2: Hold a Town-sponsored hazard mitigation seminar for the community

residents, including information on preparedness for all hazards significant to Caswell Beach.

Progress: This strategy is addressed through the Town's implementation of required CRS activities.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Caswell Beach 1.1.3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the Town hall and other community owned, public facilities in Town.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Caswell Beach 1.2.1: Manually disperse and have a website posting which provides information about the Town of Caswell Beach Emergency Response Plan and The Time Sensitive Hurricane Plan and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies

(Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Caswell Beach 1.2.2: Manually disperse and have a website posting which provides information about the Town's Community-Based Hazard Mitigation Plan and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3, BC5

Strategy Caswell Beach 1.3.1: Update and revise the Town of Caswell Beach Emergency Response Plan and The Time Sensitive Hurricane Plan on an annual basis. The plans should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: The Town reviews and updates the local emergency response procedures in conjunction with Brunswick County emergency management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Caswell Beach 1.4.1: Maintain evacuation routes in the event of a hazardous event.

Progress: Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Caswell Beach 1.4.2: The Town should publicize, on the Town's website, a map of evacuation routes which will facilitate the evacuation of Caswell Beach in case of a hazardous event.

Progress: All evacuation routes have been mapped by the Brunswick County GIS department and are reviewed and updated annually as needed. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Caswell Beach 2.1.1: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result

of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Caswell Beach 3.1.1: Continue to enforce the North Carolina Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Caswell Beach 3.2.1: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts
focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Caswell Beach 3.3.1: The Town will take a proactive approach in investigating dangerous damaged structures.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17, BC30

Strategy Caswell Beach 4.1.1: Procure GIS and GPS services through outsourcing for all the town's mapping needs and to assist in monitoring the rate of erosion.

Progress: This strategy has been completed and therefore, will be removed through the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 4.2.1: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Town's capability to generate maps when needed.

Progress: The County continues to maintain a full-service GIS department which addresses the County and municipal overall mapping and data needs. This routine is considered a day-to-day operation for the County.

Status/Corresponding 2015 Strategy: BC43

Strategy Caswell Beach 4.3.1: Identify damage prone properties and develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the Town to easily identify properties at high risk of damage from certain hazards as well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information, the Town should send a survey to all residents requesting information that should be included in the database.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13, BC17

Strategy Caswell Beach 5.1.1: This should utilize the use of various pervious surfaces in parking lots in recreational areas near the floodplain. The zoning and subdivision ordinances should be revised to require this action.

Progress: The Town has not accomplished this strategy; however, the Town will consider changes to land development regulations that will assist with mitigation efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Caswell Beach 5.2.1: Protect/Enhance Shoreline Vegetation. The Town should revise its zoning and subdivision ordinance to incorporate shoreline vegetation protection buffers along the AEC's and Canals in order to help mitigate flooding and to filter stormwater runoff before it comes in contact with local surface waters.

Progress: The Town has not accomplished this strategy; however, the Town has worked with NCDEQ and the US Army Corps of Engineers. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation

Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC20, BC22

Strategy Caswell Beach 5.3.1: Using the Stormwater Drainage Study conducted in August 2000 as a guide, complete and adopt a Stormwater Management Plan.

Progress: The Town has collaborated with the County and NCDEQ to increase standards related to stormwater runoff. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Caswell Beach 5.3.2: Adopt and enforce a Stormwater Ordinance incorporating best management practices to control stormwater runoff from development and redevelopment sites.

Progress: The Town has collaborated with the County and NCDEQ to increase standards related to stormwater runoff. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Caswell Beach 5.3.3: Establish and empower a Stormwater Committee to assist the Planning Board in the development of a local Stormwater Management Plan, Stormwater Ordinance and the implementation of said plan and ordinance. The Town has attempted to establish a Stormwater Committee in the past but was unsuccessful in their attempts. The local governing body should once attempt to establish this committee by using the public education and outreach aspect of this plan to educate the public on the need for such a committee and the need for strong public participation.

Progress: This strategy has not been carried out; however, the Town has and continues to work with NCDEQ and the County to ensure proper stormwater controls. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Caswell Beach 6.1.1: Continue to prioritize beach nourishment as a means of mitigating coastal beach erosion. Beach nourishment has been successfully used, in the past, to increase the amount of sand, to adjust the shoreline profile, to replenish depleted sand supplies and, through literal transport processes to supply sediment to downdrift shorelines.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 6.1.2: Complete implementation of the Strategic Plan and its subsequent plans.

Progress: This strategy has been eliminated due to its vague and ambiguous language.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 7.1.1: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The Town has not direct mailed notices to property owners regarding the Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Caswell Beach 7.1.2: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Caswell Beach Emergency Response Plan as it relates to the expectations of the Town's water supplier.

Progress: This effort was completed in 2012 and will be implemented through future updates of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Caswell Beach 8.1.1: To improve road visibility during hazardous road conditions, encourage NCDOT to place new reflector poles along road edges and in the dividing line on all major roads in the Town.

Progress: The Town continues to collaborate with the County and NCDOT to address this issue. Some progress has been made; however, it continues to be an issue. This strategy will now be addressed through strategies developed and implemented at the County-wide level.

Status/Corresponding 2015 Strategy: BC11

Strategy Caswell Beach 9.1.1: Continue to encourage proper waste disposal and recycling. In order to protect the vulnerable aquifer from contamination, the Town should do all it can to prevent seepage of wastes and toxic elements into the ground. Proposal disposal of waste and recycling when possible will aid

in this effort. This measure may be implemented through a Town policy or through public education measures.

Progress: This strategy was deemed a day-to-day function of the town and not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.1.2: Implement a central wastewater collection system. One of the highest risks to groundwater is the septic tank system currently being used to handle the Town's wastewater. Studies show that by replacing the current septic tank system with a central collection system the level of groundwater contamination will be drastically reduced.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.1.3: To assist in the control and governance of the central wastewater system, the Town should develop a Wastewater Management Ordinance. This ordinance should include a list of potentially hazardous materials whose deposit into the central wastewater system should be prohibited.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.2.1: The Town should provide annual calibration of the 6" and 2" meters located at the Oak Island Beach Villas, Caswell Dunes, Arboretum, US Coast Guard Station, and the Baptist Assembly.

Progress: The Town has conducted these calibrations on an annual basis over the last five years. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.2.2: Replace still meters with new water meters and/or meter boxes.

Progress: The Town has replaced a number of meters over the last five years. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.2.3: Replace many of the meters in use by home owners which are old and have questionable accuracy.

Progress: The Town has replaced a number of meters over the last five years. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.1: The town purchases water from the county which is responsible for ensuring that the water meets all state and federal laws for safe drinking water. As a means of verifying the water quality, the Town should continue to maintain a Water Sampling Schedule on a continuous basis.

Progress: The Town has worked closely with local water and sewer districts over the last five years to ensure access to a potable water supply. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.2: It appears that waterlines were designed for each of the Town neighborhoods, and in some instances new subdivisions, without apparent consideration of a water system for the entire town. As a result, there are several waterlines that dead end in neighborhoods resulting in stale distasteful drinking water. One solution to this problem is to continue the scheduled flushing that is now being performed by Public Utilities throughout the Town.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.3: The Town does not have maps of the complete Town water system. The lack of built drawings is a major problem particularly as it affects waterline repairs, water turn offs required due to breaks, and fire protection. In an effort to rectify this issue, the Town should conduct a hydraulic analysis of the town's water distribution system to identify deficiencies and ensure protection of public health and safety.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.4: Determine if connecting the dead end waterlines will increase the amount of water flow to significantly affect the town's water supply for the purpose of fire protection. At the same time, eliminating dead end waterlines will reduce the need for frequent flushing ergo reducing the loss of unmetered water.

Progress: The Town has not carried out this strategy, but intends to carry it out as funding becomes available. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with

effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2, BC15

Strategy Caswell Beach 9.3.5: There are a number of alternatives that will be considered when attempting to increase the town's water flow and water pressure. These alternatives will be reviewed as part of the proposed engineering study and will include a cost benefit analysis to assist in the town's decision making. The risk in not implementing an alternative is to continue to lack sufficient water flow to put out a major fire in the town.

Progress: The Town has not carried out this strategy, but intends to carry it out as funding becomes available. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC15, BC16

Strategy Caswell Beach 9.3.6: Continue to review and revise the Town ordinances to be certain the Town ordinances meet the N.C. State Plumbing Code Standards and State Board of Health requirements.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.7: By state law, all double check valve assemblies and Reduced Pressure Zones must be in place by July, 2003. The Town should monitor double check valve assemblies and Reduced Pressure Zones to ensure they are in place by the state deadline.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 9.3.8: The Town shall work with other appropriate governmental bodies, namely Brunswick County, and surrounding municipalities to provide for a continued pure supply of potable water.

Progress: The Town has worked closely with local water and sewer districts over the last five years to ensure access to a potable water supply. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Caswell Beach 10.1.1: Maintain fire event preparedness. The fire department has the responsibility to assure the Town's protection during fire events. Part of this responsibility is dependent upon the department's ability to maintain the materials and a knowledge base for addressing such an event. This responsibility must be supported by provision of adequate funding for the continuing education and materials necessary to maintain this preparedness.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Caswell Beach 10.2.1: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Caswell Beach 10.2.2: Evaluate and improve fire fighting procedures.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Caswell Beach 10.2.3: Ensure the fire hydrants are working properly.

Progress: The Town Public Works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Caswell Beach 10.3.1: Revise the Zoning Ordinance to prohibit the use of fireworks in the Town limits of Caswell Beach.

Progress: This strategy was completed in 2013 and will be enforced moving forward. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Caswell Beach 11.1.1: Maintain hazardous materials event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the county till the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC49

Strategy Caswell Beach 11.2.1: The Town should inspect all propane tanks located within the town limits of Caswell Beach to ensure they are secured as established through state regulations. Town officials have identified their concern is primarily related to tanks floating through town during high water events. However, this strategy will also prevent said tanks from being blow over due to high wind events. In addition, the Town should establish a method of ensuring problems with any tanks that are not properly secured are rectified.

Progress: It has been determined that staff does not have the resources to carry out this strategy. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 11.2.2: The Town should annually inspect all propane tanks located within the town limits of Caswell Beach to ensure there are no leaks from the tanks and to ensure there has been no surface soil contamination from the tanks.

Progress: It has been determined that staff does not have the resources to carry out this strategy. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Caswell Beach 12.1.1: Maintain nuclear event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness. This may be made part of the Towns Emergency Response Plan.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Town of Holden Beach

Strategy Holden Beach 1.1.1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop. The Town will install a monitoring program on the website to track hits to the website.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Holden Beach 1.1.2: Hold a Town-sponsored hazard mitigation seminar for the community residents, including information on preparedness for all hazards significant to Holden Beach. Each May, the Town coordinates with the County Emergency Management Coordinator to hold the seminar to give residents the information and tools needed to respond to any hazard.

Progress: This strategy will be carried out as a function of the Town's CRS program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Holden Beach 1.1.3: Provide new home and property buyers with information on quality

redevelopment and safe housing development. The information is probably most efficiently dispersed at the Town hall and other community owned, public facilities in Town.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Holden Beach 1.2.1: Manually disperse and have a website posting which provides information about the Town's State of Emergency Ordinance and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Holden Beach 1.2.2: Manually disperse and have a website posting which provides information about the Town's Hurricane Preparedness Plan and relevant emergency response and preparedness actions the public can take.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Holden Beach 1.2.3: Provide a public information display in the Town Hall lobby.

Progress: This display was installed in 2012 and is maintained and updated as necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Holden Beach 1.2.4: Provide survey cards during the annual POA meeting.

Progress: This strategy does not relate to the Town's mitigation program and is therefore, being eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 1.2.5: Provide information on the public access channel (Ch.8) on television concerning the community based hazard mitigation plan and the associated documents.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: R7, B1, BC5

Strategy Holden Beach 1.2.6: Manually disperse and have a website posting which provides information about the Town's Community-Based Hazard Mitigation Plan and relevant mitigation actions the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The Town has maintained the Hazard Mitigation Plan on the Town's website over the last five years. Upon adoption, this document will replace the existing HMP. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC5

Strategy Holden Beach 1.3.1: Update and revise the Town of Holden Beach State of Emergency Ordinance on an annual basis. The State of Emergency Ordinance should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: The Town reviews and updates the local emergency response procedures in conjunction with Brunswick County emergency management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Holden Beach 1.4.1: Maintain evacuation routes in the event of a hazardous event.

Progress: Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Holden Beach 1.4.2: The Town should publicize, on the Town's website, a map of evacuation routes which will facilitate the evacuation of Holden Beach in case of a hazardous event.

Progress: All evacuation routes have been mapped by the Brunswick County GIS department and are reviewed and updated annually as needed. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5, BC21

Strategy Holden Beach 1.4.3: The Town should distribute via Brunswick County water bills, realty companies, the Holden Beach Property Owner's Association, and the town hall public information rack, maps of evacuation routes which will facilitate the evacuation of Holden Beach in case of a hazardous event.

Progress: All evacuation routes have been mapped by the Brunswick County GIS department and are reviewed and updated annually as needed. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Holden Beach 2.1.1: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through

updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Holden Beach 2.1.2: Purchase, as necessary, backup generators as determined by the results of 2.1.1. Install, as necessary, generator quick connects, as determined by the results of 2.1.1.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Holden Beach 3.1.1: Continue to enforce the International Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Holden Beach 3.2.1: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Holden Beach 3.3.1: The Town will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed

through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17, BC30

Strategy Holden Beach 3.4.1: Bury the utility lines on Swordfish Drive, Brunswick Avenue West, and those crossing the Intracoastal Waterway in an effort to complete the utility line burial project which began in 1989. Once this portion of the project is finished, the entire community will receive its utilities from buried lines, thus, depleting the potential for service interruption as a result of line breakage for natural hazards. This project is complete as of 2008 and the Town will continue its policy of requiring developers to install utilities underground.

Progress: This effort is complete and therefore, it is eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 4.1.1: Purchase a complete GIS/GPS setup and provide training on said setup to all pertinent town personnel. As of 2008, the Town has its own GIS system, and utilizes this technology to maintain historical data as well as current information regarding particular Town ordinances.

Progress: This strategy has been completed and therefore, will be removed through the plan update.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Holden Beach 4.2.1: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Town's capability to generate maps when needed. Utilizing the GPS system, the Town maintains a database with this information and can provide this information as requested

Progress: The Town has acquired a GIS/GPS system and updates pertinent data on an as needed basis. These efforts have also included maintaining data layers defining the Town's Flood Hazard Area. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy Holden Beach 4.3.1: Develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the Town to easily identify properties at high risk of damage from certain hazards as well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information, the Town should send a survey to all residents requesting information that should be included in the database. This database is in place and is

maintained as new information is received.

Progress: This strategy has not been completed to date. The Town will consider establishing this database following future storm events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table
6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Holden Beach 5.1.1: Revise the Zoning and Subdivision Ordinance to require the utilization of various pervious surfaces within the floodplain in order to reduce stormwater runoff. This should include utilizing the use of various pervious surfaces in parking lots in recreational areas near the floodplain. The Town amended their ordinances to provide for the use of pervious materials. The Town will continue to amend its ordinances as new BMP's become available.

Progress: This strategy has not been carried out due to changing views regarding the effectiveness of permeable pavement. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Holden Beach 5.2.1: Revise the zoning and subdivision ordinance to incorporate shoreline vegetation protection buffers along the AEC's and Canals in order to protect the character and to help mitigate flooding. In 2004, the Town amended its ordinances to require this important buffering process.

Progress: The Town has not implemented this strategy; however, the Town has worked closely with NCDEQ to enforce state and local CAMA regulations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Holden Beach 5.2.2: Protect surrounding surface water and ecosystems from pollutants often associated with flooding and stormwater runoff. Specifically, the Town will provide a natural, vegetative toxin/pollutant filter at the end of all Town owned roads and streets (i.e., Halstead, Roger, Boyd, Fayetteville, Lumberton, Raleigh, Sanford, Burlington, Salisbury, Durham, Charlotte, Greensboro, Lions Paw, Starfish, Sanddollar, Marlin, Tarpon, Dolphin, and Tuna). The Town will continue this project as funds become available.

Progress: The Town has maintained and enforced its stormwater management ordinance over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2).

This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Holden Beach 6.1.1: Continue to prioritize beach nourishment as a means of mitigating coastal beach erosion.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 6.1.2: Develop a Beach Management Plan which will include annual monitoring of literal drift erosion, to address the long-term issue of beach erosion. The Town appointed a 9-member Shoreline Protection Committee; however, this committee was not able to accomplish its goals and objectives. In 2008, a new committee was appointed reducing the number of members to 5 and they have been tasked with developing a vegetation plan.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 7.1.1: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The Town has not direct mailed notices to property owners regarding the Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Holden Beach 7.1.2: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Holden Beach State of Emergency Ordinance as it relates to the expectations of the Town's water supplier.

Progress: This effort was completed in 2012 and will be implemented through future updates of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC53

Strategy Holden Beach 7.2.1. The Town should continue their proactive approach to mitigation by connecting Rainwater Retention Drums to the downspouts of each gutter system on every municipal building within Holden Beach. The collected water should be used to irrigate all municipal gardens, parks, lawns, and the like.

Progress: This strategy has been eliminated through this plan update due to a lack of funding and political will.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 8.1.1: Develop a tornado and waterspout warning system. The Town researched this type of system and determined it was cost prohibitive at this time. The Town developed a more cost effective measure by educating the public and join in the campaign with local TV stations to encourage citizens to purchase individual weather alert radios. This type of warning system was determined to be not only more cost effective but more benefit to the individuals because they can have the radio with them at all times.

Progress: The Town has carried out this strategy and has several employees trained in early detection techniques. The Town will maintain continuing education for relevant staff members. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35

Strategy Holden Beach 9.1.1: To improve road visibility, encourage the Department of Transportation to place new reflector tape or paint along road edges and in the dividing line should be placed on all major roads through Town.

Progress: The Town continues to collaborate with the County and NCDOT to address this issue. Some progress has been made; however, it continues to be an issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Holden Beach 10.1.1: Continue to encourage proper waste disposal and recycling. In order to protect the vulnerable aquifer from contamination, the Town should do all it can to prevent seepage of wastes and toxic elements into the ground. Proposal disposal of waste and recycling when possible will aid in this effort. This measure may be implemented through a Town policy or through public education measures.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 10.1.2: The zoning ordinance should be amended to prohibit underground chemical and gasoline storage that are a risk to groundwater resources.

Progress: The Town has worked closely with NCDEQ, the local LEPC, and the US Army Corps of Engineers to oversee installation and monitoring of underground tanks. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Holden Beach 10.1.3: The zoning ordinance should be amended too prohibit the storage of toxic wastes within the planning jurisdiction. This amendment was approved by the Town Council. Staff will continue to monitor this issue and amend the Zoning Ordinance as needed.

Progress: The Town has worked closely with NCDEQ, the local LEPC, and the US Army Corps of Engineers to oversee installation and monitoring of underground tanks. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Holden Beach 10.1.4: The Town shall work with other appropriate governmental bodies, namely Brunswick County, Shallotte, and Ocean Isle Beach to provide for a continued pure supply of potable water.

Progress: As noted, the Town has worked closely with local water suppliers to provide a sanitary and consistent potable water supply. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Holden Beach 10.1.5: Implement a central wastewater collection system. Studies conducted by the Town have shown that the highest risk to groundwater is the septic tank system currently being used to handle the Town's wastewater.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 10.1.6: Develop a Wastewater Management Ordinance to assist in the control and governance of the central wastewater system. This ordinance should include a list of potentially hazardous materials whose deposit into the central wastewater system should be prohibited. Since the

Town is a partner with Brunswick County, the Town will adopt the County's Sewer Use Ordinance.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 10.1.7: Amend the Stormwater Management Ordinance to include a list of potentially hazardous materials that should not be deposited into local drainage systems or surface waters. This Ordinance as amended by the Town and the Director of Planning & Inspections will ensure the enforcement and ensure the Town stays in compliance with the state stormwater rules.

Progress: Over the last five years, the County has effectively enforced state and local stormwater management regulations. The Town will update these regulations as deemed necessary, or when amendments will positively impact the Town's mitigation program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Holden Beach 11.1.1: Maintain fire event preparedness.

Progress: The Town's fire department works closely with County Emergency Management to improve upon and educate regarding the issue of fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC52

Strategy Holden Beach 11.2.1: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: The Town's fire department works closely with County Emergency Management to improve upon and educate regarding the issue of fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC52

Strategy Holden Beach 11.2.2: Evaluate and improve fire fighting procedures.

Progress: The Town's fire department works closely with County Emergency Management to improve upon and educate regarding the issue of fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused

on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC52

Strategy Holden Beach 11.2.3: Ensure the fire hydrants are working properly.

Progress: The Town's fire and public works departments have inspected all hydrants once annually over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC52

Strategy Holden Beach 12.1.1: Maintain HAZMAT event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the county till the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: Town emergency management staff in conjunction with County Emergency Management and the County LEPC have worked to enforce this strategy. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC33, BC35, BC36

Strategy Holden Beach 12.2.1: The Town shall not support offshore drilling for gas or oil and shall not permit facilities such as oil refineries, storage facilities, or staging areas within the Town.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Holden Beach 13.1.1: Maintain nuclear event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness. This may be made part of the Towns Emergency Response Plan.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective

intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Town of Leland

Strategy Leland PI-1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a City-sponsored workshop.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Leland PI-2: Hold a City-sponsored hazard mitigation seminar for the community residents, including information on preparedness, mitigation, and response for all hazards significant to Leland.

Progress: This strategy will continue to be implemented as a component of the County' s CRS program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Leland PI-3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the community administration building.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library
of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: B1, BC45

Strategy Leland PI-4: Survey local businesses to determine if they have emergency operations procedures in

place and that all employees are aware of said procedures.

Progress: This strategy has not been carried out by the Town; however, local business owners have been provided education and outreach regarding natural hazards through County EOP procedures over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC36

Strategy Leland PI-5: Manually disperse and have a website posting which provides information about the Community-Based Hazard Mitigation Plan for Leland and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The Town has maintained the current Hazard Mitigation Plan on the Town website. Upon adoption of this update, the Town will replace the current document and continue to make it available through implementation of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Leland PI-6: Develop a Town of Leland Emergency Response Plan. The Emergency Response Plan should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: The Town reviews and updates the local emergency response procedures in conjunction with Brunswick County emergency management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Leland PI-7: Manually disperse and post information on the Town-sponsored website about the Town's Emergency Response Plan and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Leland PI-8: Develop an Alert System to improve the Town's communications with citizens during impending disasters.

Progress: The Town has collaborated over the last five years with County Emergency Management to provide an emergency alert system available to all residents. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC46

Strategy Leland PI-9: Implement a reverse 911 system to assist the Police Department with the Elder Check Program to assist in contacting at risk populations during emergency situations. This program is already being implemented but a reverse 911 system would improve the performance of the program.

Progress: The Town has not established a municipal reverse 911 system. The Town has relied on the County Emergency Management for this service. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC46

Strategy Leland PI-10: Coordinate with local churches and Spanish speaking representatives to disperse information about the hazards prevalent in the area and the steps they can take to mitigate these hazards.

Progress: The Town has not carried out this strategy; but has relied on services provided through County Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC48

Strategy Leland P-1: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective

intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Leland P-2: Continue to enforce the North Carolina State Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Code.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Leland P-3: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Leland P-4: The Town will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The Town addresses this issue on an ongoing basis due to future impacts of natural hazard events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of
collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17, BC30

Strategy Leland P-5: Hire and train a local Building Inspector. The Town is currently working with Brunswick County to ensure the North Carolina State Building Codes are implemented in the Town. However, they are hiring and training a local Building Inspector in an effort to improve their current institutional capability.

Progress: This strategy has been completed and, therefore, will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Leland P-6: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Town's capability to generate maps when needed.

Progress: The Town has an established GIS program and has maintained local floodplain data on this system for the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy Leland P-7: Develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should also include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the Town to easily identify properties at high risk of damage from certain hazards as well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information, the Town should send a survey to all residents requesting information that should be included in the database.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13, BC17

Strategy Leland P-8: Purchase 15 vehicle radios for the Police Department and 15 hand-held radios for the Police Department.

Progress: The Town has purchased fifteen radios over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC50

Strategy Leland P-9: In order to reduce stormwater runoff, the Town should utilize various pervious surfaces within the floodplain. This should include the use of various pervious surfaces in parking lots in recreational areas near the floodplain. The zoning and subdivision ordinances should be revised to require this action.

Progress: The Town has not accomplished this strategy; however, the Town will consider changes to land development regulations that will assist with mitigation efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in

the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B10

Strategy Leland P-10: Develop a Floodplain Management Plan to assist in preventing wetland fill-in and wetland development.

Progress: This Regional Hazard Mitigation effort will serve as the Town's Flood Management Plan moving forward.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Leland P-1 1: Update the Flood Damage Prevention Ordinance.

Progress: The Town maintains an updated Flood Damage Prevention Ordinance. The Town will continue to review the Flood Damage Prevention Ordinance annually and update it as deemed necessary and/or required by FEMA and NCDPS. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Leland P-12: Develop a Stormwater Advisory Committee to develop a Stormwater Ordinance in an effort to limit future stormwater drainage issues in the Town.

Progress: The strategy has been completed in concert with implementation of the County's Stormwater Management program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Leland P-13: Develop a standby acquisition application to remove all structures with repetitive loss located in the 1 00-year floodplain.

Progress: This strategy has not been completed. In lieu of this effort, the Town works directly with NCDPS to complete applications as necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC26

Strategy Leland P-14: Become a member of the Community Rating System program through the NFIP.

Progress: The Town has not joined the CRS program to date; this decision was based on the cost-benefit that the program will provide. The Town will revisit this action through implementation of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC7

Strategy Leland P-15: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The Town has worked closely with local water suppliers to develop and disseminate information regarding the Town's Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Leland P-16: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Emergency Response Plan.

Progress: The Town has worked closely with local water suppliers to develop and disseminate information regarding the Town's Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Leland P-17: Maintain fire event preparedness. The fire department has the responsibility to assure the Town's protection during fire events. Part of this responsibility is dependent upon the department's ability to maintain the materials and a knowledge base for addressing such an event. This responsibility must be supported by provision of adequate funding for the continuing education and materials necessary to maintain this preparedness.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Leland P-18: Explore and seek access to all potential sources of information and continuing education for firefighters.

Progress: The Town's fire department works closely with County Emergency Management to improve upon and educate regarding the issue of fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC52

Strategy Leland P-19: Evaluate and improve fire fighting procedures.

Progress: The Town's fire department works closely with County Emergency Management to improve upon and educate regarding the issue of fire event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC52

Strategy Leland P-20: Ensure the fire hydrants are working properly.

Progress: The Town's fire and public works departments have inspected all hydrants once annually over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC52

Strategy Leland P-21: Maintain a current action plan for hazardous materials event response. The Town should develop a plan of action to maintain the materials and knowledge base for addressing such a spill. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC33, BC36

Strategy Leland P-22: Maintain a current action plan for nuclear event response. The Town should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain

this preparedness. This may be made part of the Town's Emergency Response Plan.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Strategy Leland P-23: Conduct a survey with each department to identify the current training needs of each department. The list from each department should be prioritized and should be developed according to current and future staffing.

Progress: This strategy was deemed irrelevant in relation to the Town's mitigation efforts and will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Leland P-24: Educate a primary staff person in conversational Spanish.

Progress: The Town has Spanish speaking staff; however, no formal plan is in place to expand these efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC48

Strategy Leland P-25: Work with volunteer organizations to develop standard operation procedures to be used during disaster recovery and response.

Progress: This strategy has been completed through collaboration with Brunswick County Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Leland PA-1: Have each member of the Planning Board read and respond in group discussion to the NCAPA Citizen Planners Training Program Module.

Progress: This strategy was deemed irrelevant in relation to the Town's mitigation efforts and will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Leland PA-2: Conduct a mini-conference to discuss and revise the community vision in an effort to make the community more proactive in regards to development.

Progress: The Town has accomplished this strategy through ongoing planning efforts; it will be eliminated from this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Town of Navassa

Strategy Navassa P-1 : In cooperation with Brunswick County, set up program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (CRS 320)

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches

and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Navassa P-2: Continue/expand efforts to partner with area utility districts to encourage proper development of regional sewer systems.

Progress: These efforts are ongoing and the Town works closely with County sewer districts to expand County- wide sewer.

Status/Corresponding 2015 Strategy: BC2

Strategy Navassa P-3: In cooperation with Brunswick County, ensure, when possible, that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE). (CRS 430)

Progress: No modifications have been made to Town critical facilities over the last five years; however, the Town continues to utilize the data in this plan when considering development of new critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Navassa P-4: In cooperation with Brunswick County, continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services – fire, rescue, medical, etc.

Progress: No modifications have been made to Town critical facilities over the last five years; however, the Town continues to utilize the data in this plan when considering development of new critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3, BC5

Strategy Navassa P-5: In cooperation with Brunswick County, continue to address and strengthen approach to "scattered and sprawling, large lot subdivision activity," "unplanned commercial strip development," "sewage problems and sewage solutions," and "storm water runoff and drainage."

Progress: This strategy was completed through update and adoption of the County's Unified Development Ordinance within the last five years.

Status/Corresponding 2015 Strategy: Completed.

Strategy Navassa P-6: In cooperation with Brunswick County, strengthen the land use classification system by more closely defining allowed uses and designating certain areas as off limits to development.

Progress: The County reviews and updates the Land Use Plan on a regular basis. These efforts will continue; therefore, this strategy has been eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Navassa P-7: In cooperation with Brunswick County, continue to strengthen policies directing urban level growth to appropriate locations where services can be provided.

Progress: This strategy has been completed through ongoing land use planning and zoning management over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC15

Strategy Navassa P-8: In cooperation with Brunswick County, continue to review and update the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE.

Progress: The County, as well as all participating jurisdictions, reviews and updates their respective Flood Damage Prevention Ordinances as deemed necessary, or when mandated by NCDPS and/or FEMA

through the NFIP. Additionally, all existing locally adopted Base Flood Elevation standards will be maintained.

Status/Corresponding 2015 Strategy: BC9

Strategy Navassa P-9: Evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with the land classification map, the water distribution system, and existing and future sewer systems.

Progress: This strategy has been completed through ongoing land use planning and zoning management over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Navassa P-10: Continue efforts to revise, update, and improve subdivision regulations particularly with regard to open space and tree preservation.

Progress: This strategy has not been carried out over the last five years. The Town will consider these amendments moving forward. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Navassa P-11: Continue to improve road access standards to protect the integrity of significant traffic-carrying roadways throughout the Town.

Progress: This strategy has been completed through ongoing land use planning and zoning management over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC11

Strategy Navassa P-12: In cooperation with Brunswick County, continue to review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.

Progress: This strategy has been carried out in collaboration with Brunswick County Planning and Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13

Strategy Navassa P-13: In cooperation with Brunswick County, cntinue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of the 100-year floodplain (CRS 310).

Progress: The County, as well as all participating municipalities, continue to require the submittal of FEMA Elevation Certificates for development within the defined Flood Hazard Area. This strategy has been updated to reflect current regulatory and record keeping requirements.

Status/Corresponding 2015 Strategy: BC14

Strategy Navassa P-14: Continue to allot capital funding for the implementation of hazard mitigation activities.

Progress: This strategy is taken into consideration during budget deliberations on an annual basis in an attempt to further the town's mitigation program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16

Strategy Navassa P-15: Consider a shoreline overlay district to include requirements for more intense review of proposed drainage, and limitation on the type of land uses allowed within the overlay district.

Progress: This strategy has not been carried out because of uncertainty concerning future development along the shoreline. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

City of Northwest

Strategy Northwest P-1: Using formed Disaster Committee to identify specific hazards, notify endangered parties in advance of storms.

Progress: This strategy has not been carried out locally by the Town. All emergency management efforts are carried out in conjunction with Brunswick County Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Northwest P-2: Enforce ordinances to block construction in flood zones.

Progress: The Town has regulated development in the floodplain over the last five years through enforcement of the Town's Flood Damage Prevention Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9, BC10

Strategy Northwest P-3: Work with NCDOT and local crews to treat roads in advance of storms, and clear roads afterward as soon as possible.

Progress: The Town works closely with Brunswick County Emergency Management and NCDOT to carry out this strategy. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Northwest P-4: Work with the local power service company to have crews on call in case of power outages, and keep access roads to power lines clear.

Progress: The Town works closely with Brunswick County Emergency Management and local utility providers to carry out this strategy. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Northwest PI-1: Provide residents with information about emergency services available.

Progress: The Town has maintained Emergency Management information on the Town's website. These efforts will continue in collaboration with Brunswick County Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Northwest ES-1: Bolster inventory of equipment and services available to residents.

Progress: This strategy was deemed to be vague and will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Northwest ES-2: Improve equipment and training for fire fighters, and implement outside resources.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the

County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Northwest S-1: Construct storm drainage piping and ditch improvements.

Progress: The Town was not able to carry out this strategy locally, but will continue to seek funding for this capital improvement through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16, BC57

Town of Oak Island

Strategy Oak Island 5-3.1.1: Building Inspectors will continue to enforce local codes on building and development - zoning, subdivision regulations, NC State Building Code, Flood Damage Prevention, Stormwater Regulations, and Dune Protection Regulations.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. Additionally, other ordinances listed have been actively enforced and reviewed/updated annually as necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Oak Island 5-3.1.2: Continue enforcement of the following: (1) one-foot freeboard above the FEMA required height above base flood elevation as determined by the NFIP; (2) requiring a survey and elevation certificate for all construction within a VE zone; (3) Requiring that break away walls or flood gates be installed in all enclosed areas in any flood zone; and (4) Requiring that no electrical, mechanical, or plumbing fixtures other than those required by building code or the NEC be located below base flood

and the freeboard.

Progress: The Town has not updated the local Flood Damage Prevention Ordinance over the last five years; however, an update will be carried out in conjunction with the adoption of updated flood maps. The Town has, however, pro-actively enforced the FDPO standards over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9, BC10

Strategy Oak Island 5-3.1.3: The Town will continue participation in CRS program. Continue program to advise/assist property owners in retrofitting homes, businesses and institutional facilities.

Progress: The Town has continued participation in the CRS program, including assisting property owners in retrofitting homes, businesses, and institutional facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC47, Table 6-5 (page 6-40)

Strategy Oak Island 5-3.1.4: The Town will continue the local CAMA development Permit Program using town employees. The Town will continue to monitor and update the CAMA Land Use Plan in accordance with the state guidelines. All policies and actions listed in the CAMA Land Use Plan.

Progress: The Town has not updated the local CAMA Land Use Plan; however, the standards outlined in the plan have been enforced. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Oak Island 5-3.1.5: The Planning Board will continue review of current zoning, building and development codes to determine consistency with Land Use and Coastal Management Policies. This process focuses on the codes adopted by the Town Council --- zoning ordinance, subdivision regulations, flood damage prevention ordinance, and stormwater ordinance. The Planning Board will make recommendations to the Town Council on any required code adjustments needed to maintain consistency with the Land Use Plan policies, and to minimize impacts of natural hazards.

Progress: The Town has not amended the codes over the last five years; however, these regulations have been enforced. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10, BC25

Strategy Oak Island 5-3.1.6: The town will continue with the installation of the central wastewater treatment system. The wastewater program involves multiple phases. Each phase will be reviewed and approved by the Town Council before proceeding to the next step. Ongoing Stormwater runoff planning: actively implementing additional regulations for limiting impervious surfaces, re-routing stormwater from public streets, and maintaining natural watercourses for proper drainage. The town is aggressively seeking and studying ways to expand and more efficiently operate its biological wastewater treatment facility.

Progress: The Town has completed installation of the Town's central wastewater system. No amendments have been made to the Stormwater Management Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Oak Island 5-3.1.7: The Town staff will continue holding multi-government preparedness meeting yearly to update, change, and clarify evacuation information. By cooperating with the other local governments, Fire and Police Departments, Brunswick Electric Membership Corporation, Progress Energy Carolinas, Inc., Brunswick County Emergency Management, Brunswick County Sheriff's Department, U.S. Coast Guard, and the N.C. State Police we achieve the best possible evacuation and re-entry plans possible for Oak Island.

Progress: The Town has collaborated with the County and other relevant jurisdictions/agencies to implement the County Emergency Operations Plan over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B5

Strategy Oak Island 5-3.1.8: The Town Council supports the TIP projects (Second Bridge and 211 Intersection realignment) that help with evacuation of the Island.

Progress: The Town has pro-actively supported the NCDOT in their efforts to implement the County TIP. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Oak Island 5-3.1.9: The code officers will continue enforcement of an ordinance that prohibits structures on the public beach. It is the policy of the town to prohibit any structure from landing on

public property. Public property, in this case is defined as any area seaward of the mean high tide line as surveyed and recorded by the USACE prior to the commencement of the Sea Turtle Habitat Restoration Project and the Section 933 Cape Fear River Dredging Project. Continue enforcement of the other ordinances limit the construction of decks, walkways, and steps of oceanfront structures. These steps were taken to minimize damage created from debris and projectiles during storm events and storm surge. These ordinances are reviewed as necessary, making changes that will better protect the interests of the town and its residents. The town will continue to participate in the Coastal Strom Damage Reduction Project and the Wilmington Sand Management Plan.

Progress: Due to the rapidly changing issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Oak Island 5-3.1.10: Continue development of a strategic plan/capital improvements program.

Progress: The Town has maintained a CIP over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16

Strategy Oak Island 5-3.1.11: Present these plans quickly to the public and make sure they are available to all municipal buildings, libraries, and any other public site possible. The Town of Oak Island broadcasts these plans on the town-operated television and radio channels as well as the local radio and news stations. Plan activities to educate the general public of planning for floods, storm events, and evacuations. Implement and assist staff in the organization of public information meetings, holding question and answer forums on preparedness, planning hazards, development, and mitigation.

Progress: This strategy has been carried out as a function of the Town's emergency management program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC5, BC46

Strategy Oak Island 5-3.1.12: Ongoing review and updates to the Floodplain Management Plan and Action Plan. Assisting staffs with information gathering to better improve the Town's NFIP CRS rating.

Progress: This strategy is being accomplished through this plan update and therefore will be eliminated. The process for implementation and future updates is outlined in Section 7 of the plan.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Oak Island 5-3.2.1: After any event that causes damages to structures located in what are considered to be in repetitive loss areas, we encourage those people that must replace pilings to raise their non-conforming structures out of the floodplain. As an incentive to do this, the cost of the pilings is not calculated in their repair. The Division of Coastal Management also utilizes these guidelines. Continue enforcement of building codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies

(Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28, BC43

Strategy Oak Island 5-3.2.2: Continue to monitor and update the CAMA Land Use Plan in accordance with the state guidelines, preparing for the next update in 2004. (update underway 2008)

Progress: The Town has not updated the local CAMA Land Use Plan; however, the standards outlined in the plan have been enforced. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Oak Island 5-3.2.3: Continue Planning Board review of current zoning, building and development codes to determine consistency with Land Use and Coastal Management Policies. This process focuses on the codes adopted by the Town Council - zoning ordinance, subdivision regulations, flood damage prevention ordinance (2006), and stormwater ordinance (2009). The Planning Board will make recommendations to the Town Council on any required code adjustments needed to maintain consistency with the Land Use Plan policies, and to minimize impacts of natural hazards.

Progress: The Town has not amended the codes over the last five years; however, these regulations have been enforced. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Oak Island 5-3.2.4: Form an aggressive stormwater committee. (completed) Fill the advertised position of Stormwater Management Coordinator. The stormwater officer will be responsible for planning for and mitigating stormwater runoff problems and implementing the National Pollutant Discharge Elimination System Phase II permit. (completed) The central business district will be receiving sewer within the end of the year. (completed) Initiate planning for a central wastewater treatment system, consisting of a background information, a wastewater master plan, and system design.

(under construction) Develop a comprehensive stormwater program. (completed) Develop a water quality improvement plan for Davis Creek. Develop sub basin drainage improvement plan.

Progress: The Town has not established a stormwater management committee; however, local and state stormwater management regulations have been enforced. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Oak Island 5-3.2.5: Secure a second bridge to Oak Island. During the summer months weekend traffic slows to a crawl creating a hazard for vehicles and pedestrians. By securing a second bridge, evacuations, which at this time could take as much as twelve to twenty four hours, could be cut in half. Safety of the residents before an impending storm is the top priority of Oak Island. It is possible that the island could be completely cut off from the mainland for weeks at the time if the current bridge was damaged or became impassable. The Town will cooperate with Brunswick County to develop a regional approval to implementation of the Second Bridge Corridor Plan (done bridge under construction)

Progress: The Town pro-actively supported the NCDOT in their efforts to implement the County TIP. This strategy has been completed and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Oak Island 5-3.2.6: Implement a beach preservation plan including: (1) the implementation of an ongoing beach preservation program; (2) implementation of the Sea Turtle Habitat Restoration Project; and (3) develop a maintenance program for the long-term success of these projects. Continue participation in the Coastal Storm Damage Reduction Project. Continue participation in the Wilmington Harbor Sand Management.

Progress: Due to the rapidly changing issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Oak Island 5-3.2.7: Complete Development Services Assessment to the hazards of flooding particular to Oak Island.

Progress: This strategy has been carried out as a function of the Town's Emergency Management Program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Oak Island 5-3.2.8: Continue review and update procedures as provided in the Floodplain Management and CAMA Land Use Plan. Continue to review existing ordinances in regards to hazard mitigation.

Progress: The Town has worked diligently to carry out the terms and policies outlined in the Town's CAMA Land Use Plan and other land use regulatory ordinances.

Status/Corresponding 2015 Strategy: BC8

Strategy Oak Island 5-3.2.9: Continue to enforce local codes on building and development - zoning, subdivision regulations, NC State Building Code, Flood Damage Prevention, Stormwater Regulations, and Dune Protection Regulations.

Progress: The Town has diligently enforced the NC State Building Code and all other local regulations over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Town of Ocean Isle Beach

Strategy Ocean Isle Beach 1.1.1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Ocean Isle Beach 1.1.2: Distribute Town-sponsored hazard mitigation materials for the community residents, including information on preparedness for all hazards significant to Ocean Isle Beach on Super Saturday Weekend. These materials can be part of the "Super Saturday Weekend" at Thanksgiving (the weekend most property owners are in Town for annual Homeowner Association meetings) each year.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include

guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Ocean Isle Beach 1.1.3: Provide all property owners a Flood Ordinance pamphlet containing information on the flood protection ordinance and flood insurance program.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: R7, BC1

Strategy Ocean Isle Beach 1.1.4: Provide existing homeowners and new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the Town hall and other community owned, public facilities in Town such as the Coastal Museum, the Community Center, the Fire Department, the Airport, and on the Town's website.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Ocean Isle Beach 1.2.1: Manually disperse and have a website posting which provides information about the Ocean Isle Beach Emergency Response Plan (updated by staff yearly) and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town has worked closely with Brunswick County Emergency Management, over the last five years, in an effort to provide citizens with accurate information regarding Natural Hazards through the Town's website. The actions defined under this locally specific strategy statement will

continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Ocean Isle Beach 1.2.2: Manually disperse and have a website posting which provides information about the Town's Community-Based Hazard Mitigation Plan and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: Information regarding the Town's existing plan has been provided to residents over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1

Strategy Ocean Isle Beach 1.3.1: Continue to update the Town of Ocean Isle Beach Emergency Response Plan on an annual basis.

Progress: This strategy has been carried out over the last five years in concert with updates to the County Emergency Operations Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Ocean Isle Beach 1.4.1: Maintain evacuation routes in the event of a hazardous event. The Town should develop a plan of action to facilitate the evacuation of Ocean Isle Beach in case of a hazardous event. The NCDOT in cooperation with the Town have posted the evacuation route with blue evacuation signs on the mainland and island roads. The evacuation route is also posted on the Town's website when there is a threat of evacuation.

Progress: Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC21

Strategy Ocean Isle Beach 1.4.2: The Town should publicize, on the Town's website, a map of evacuation routes which will facilitate the evacuation of Ocean Isle Beach in case of a hazardous event.

Progress: The Town has maintained an evacuation route map via the County Emergency Services website over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This
change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC21

Strategy Ocean Isle Beach 1.5.1: Provide cell phones, pagers, and radios or other communication equipment to ensure all emergency personnel can communicate during and event. This link should be provided to all town departments as well as other local, state, and federal officials.

Progress: The Town has collaborated with the Brunswick County Emergency Management Department to increase communication capabilities over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC50

Strategy Ocean Isle Beach 2.1.1: Monitor the status of communications for all critical public facilities. Test and monitor communications equipment on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town has collaborated with the Brunswick County Emergency Management Department to increase communication capabilities over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Ocean Isle Beach 2.1.2: Monitor the status of backup generators for all critical public facilities. SCADA monitors the infrastructure daily and automatically notifies the Town if there is a problem or malfunction. Test generators, on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Ocean Isle Beach 2.1.3: Purchase a portable generator to ensure the Town Hall, one of the Town's critical facilities, is always operational during disaster recovery operations.

Progress: This strategy has been completed and therefore will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 2.1.4: Monitor the status of vehicles for all critical public facilities. Examine vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: This strategy has been carried out by the Town over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Ocean Isle Beach 3.1.1: Continue to enforce the North Carolina Building Code, CAMA regulations, and the Flood Damage Prevention Ordinance. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Codes, CAMA regulations, and local ordinances such as the Flood Ordinance.

Progress: The Town has diligently enforced the NC State Building Code and all local and State CAMA regulations over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC22, BC25, BC28

Strategy Ocean Isle Beach 3.2.1: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines, or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Ocean Isle Beach 3.3.1: Develop a Debris Management Plan.

Progress: The Town has not developed this plan; however, over the last five years the Town has maintained a contract with a Qualified Post-Disaster Debris Contractor.

Status/Corresponding 2015 Strategy: BC38

Strategy Ocean Isle Beach 4.1.1: Update the current GIS/GPS setup and provide training on said setup to all pertinent town personnel.

Progress: This strategy has been completed and therefore, will be removed through the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 4.2.1: Develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage. Developing this database will allow the Town to easily identify properties at high risk of damage from certain hazards as well as properties which receive repetitive damage from multiple hazards. In an effort to gain historical information, the Town should send a survey to all residents requesting information that should be included in the database.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Ocean Isle Beach 5.1.1: Work with citizens to acquire grants to elevate properties that are at danger of flooding.

Progress: The Town did not treat any repetitive loss properties with elevation over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC26

Strategy Ocean Isle Beach 5.2.1: To apply for grants to move a sewer pump station out of a flood zone in a repetitive flood area to protect infrastructure.

Progress: This strategy has not been carried out; however, the Town will continue to work closely with NCDPS to address this need as necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies

(Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC26

Strategy Ocean Isle Beach 6.1.1: Continue to prioritize beach nourishment and other BMPS as a means of mitigating coastal beach erosion. Beach nourishment has been successfully used, in the past, to increase the amount of sand, to adjust the shoreline profile, to replenish depleted sand supplies and, through literal transport processes to supply sediment to downdrift shorelines.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 6.1.2: Develop a study to identify alternate beach management systems in an effort to limit erosion.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 7.1.1: Develop a tornado warning system. Several options exist for a tornado warning system. The most feasible for Ocean Isle Beach would be to develop a siren to warn of oncoming tornados. This siren would have to differentiate from the fire alarm and be well publicized for citizens to recognize.

Progress: This strategy has not been independently developed by the Town; however, the Town has worked with collaboration with Brunswick County Emergency Management regarding this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC46

Strategy Ocean Isle Beach 8.1.1: In order to minimize injury from lightning strikes, shelters should be placed within each mile in the public open space beach areas that do not have other adequate sources of shelter available. As land is subdivided or recombined for a larger development, this recommendation should be incorporated into the zoning and subdivision ordinances.

Progress: This strategy has been eliminated due to lack of political will.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 8.1.2: Driving in storm conditions can create hazardous road conditions, including decreased ability for drivers to see road boundaries. To improve road visibility, encourage NCDOT to place new reflector tape or paint poles along road edges and reflectors in the centerline on all major roads in the Town.

Progress: The Town continues to collaborate with the County and NCDOT to address this issue. Some progress has been made; however, it continues to be an issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Ocean Isle Beach 9.1.1: Continue to encourage proper waste disposal and recycling. In order to protect the vulnerable aquifer from contamination, the Town should do all it can to prevent seepage of wastes and toxic elements into the ground. Proposal disposal of waste and recycling when possible will aid in this effort. This measure may be implemented through a Town policy or through public education measures.

Progress: This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Ocean Isle Beach 10.1.1: Maintain fire event preparedness. The fire department has the responsibility to assure the Town's protection during fire events. Part of this responsibility is dependent upon the department's ability to maintain the materials and a knowledge base for addressing such an event. This responsibility must be supported by provision of adequate funding for the continuing education and materials necessary to maintain this preparedness.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Ocean Isle Beach 10.2.1: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC50, BC52

Strategy Ocean Isle Beach 10.2.2: Evaluate and improve fire sighting procedures.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Ocean Isle Beach 10.2.3: Ensure the fire hydrants are working properly.

Progress: The Town Public Works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Ocean Isle Beach 11.1.1: Maintain hazardous materials event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the county till the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Ocean Isle Beach 12.1.1: Maintain nuclear event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness. This may be made part of the Towns Emergency Response Plan.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Town of Sandy Creek

Strategy Sandy Creek P-1: In cooperation with Brunswick County, update the CAMA Land Use Plan.

Progress: The Town continues to collaborate with Brunswick County Planning on update of the CAMA Land Use Plan which was last amended in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Sandy Creek P-2: Work with Brunswick County to set up a program to advise/assist property owners in retrofitting homes, businesses, and institutional facilities. (CRS 320)

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Sandy Creek P-3: In cooperation with Brunswick County, ensure, when possible, that no public facilities are proposed for flood hazard areas. Protect new critical facilities (e.g., schools, hospitals, fire stations, emergency shelters) to 2' above the 500-year flood elevation (5' above BFE). (CRS 430)

Progress: No modifications have been made to Town critical facilities over the last five years; however, the Town continues to utilize the data in this plan when considering development of new critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Sandy Creek P-4: In cooperation with Brunswick County, continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services – fire, rescue, medical, etc.

Progress: No modifications have been made to Town critical facilities over the last five years; however, the Town continues to utilize the data in this plan when considering development of new critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed

through
updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Sandy Creek P-5: Adopt a Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events. (CRS 430)

Progress: The Town adopted a FDPO in 2005 and will continue to review and update it as deemed necessary, or when mandated by NCDPS and/or FEMA. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Sandy Creek P-6: As a follow-up to the update of the CAMA Land Use Plan, evaluate the zoning ordinance for its ability to target and direct growth to areas consistent with Land Use Plan policies.

Progress: This strategy has not been carried out to date, but will be considered through implementation of this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8, BC10

Town of Shallotte

Strategy Shallotte PI-1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a City-sponsored workshop.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Shallotte PI-2: Hold a Town-sponsored hazard mitigation seminar for the community residents, including information on preparedness, mitigation, and response for all hazards significant to Shallotte.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: Table 6-5 (page 6-40)

Strategy Shallotte PI-3: Provide new home and property buyers with information on quality redevelopment and safe housing development.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC45

Strategy Shallotte PI-4: Manually disperse and have a website posting which provides information about the Town's Emergency Response Plan and relevant emergency response actions the public can take. Also ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town maintains information regarding emergency management procedures and personnel responsibilities on the Town's website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC45

Strategy Shallotte PI-5: Manually disperse and have a website posting which provides information about the Town's Community-Based Hazard Mitigation Plan and relevant mitigation measures the public can take. Provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The Town maintains information regarding emergency management procedures and personnel responsibilities on the Town's website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide

Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC45

Strategy Shallotte PI-6: The Town should distribute via gas/electric bills maps of evacuation routes which will facilitate the evacuation of Shallotte in case of a hazardous event.

Progress: This strategy has not been carried out at the local level. The Town relies on Brunswick County Emergency Management to carry out this strategy. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, Table 6-5 (page 6-40)

Strategy Shallotte PI-7: Develop a Town-sponsored website where information relating to hazard mitigation, emergency response, and emergency preparedness can be posted.

Progress: The Town has and will continue to maintain Mitigation and Emergency Response information on the Town's website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC5

Strategy Shallotte PI-8: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The Town has pro-actively enforced and educated the public about the Water Shortage Response Plan over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B53

Strategy Shallotte P-1: Continue to update the Town of Shallotte Emergency Response Plan on an annual basis. The Emergency Response Plan should contain detailed information on responsible parties and contact info; this info should be updated as positions and contact information change.

Progress: The Town reviews and updates the local emergency response procedures in conjunction with Brunswick County emergency management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Shallotte P-2: Maintain evacuation routes in the event of a hazardous event.

Progress: The Town has and will continue to work closely with Brunswick County Emergency Management and NCDOT to maintain local evacuation routes. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B5, B21, B37

Strategy Shallotte P-3: The Town should publicize, on the Town's website, maps of evacuation routes which will facilitate the evacuation of Shallotte in case of a hazardous event.

Progress: The Town has and will continue to work closely with Brunswick County Emergency Management and NCDOT to maintain and publish local evacuation routes. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Shallotte P-4: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Shallotte P-5: Purchase, as necessary, backup generators as determined by results of Action P-4.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Shallotte P-6: Install, as necessary, generator quick connects, as determined by results of Action P-4.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators quick connects were installed during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: B51

Strategy Shallotte P-7: Continue to contract with Brunswick County to enforce the North Carolina State Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Code.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Shallotte P-8: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Shallotte P-9: The Town will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The Town addresses this issue on an ongoing basis due to rapidly changing shoreline migration and erosion issues and concerns. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC30

Strategy Shallotte P-10: Revise the Subdivision Ordinance to require underground utilities in all new residential developments, as well as all residential developments that have suffered major damage or disruption of service due to disasters, to decrease the potential for service interruption due to high wind events, ice storms, snow storms, and the like.

Progress: This strategy was not accomplished due to lack of political will and funding; therefore, it will be eliminated.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-11: Encouraged Brunswick County Electric Corporation to bury current utility lines to decrease the potential for service interruptions due to high wind events, ice storms, snow storms, and the like.

Progress: This strategy was not accomplished due to lack of political will and funding; therefore, it will be eliminated.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-12: Purchase a complete GIS/GPS setup and provide training on said setup to all pertinent Town personnel.

Progress: This strategy has been completed and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Shallotte P-13: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Town's capability to generate maps when needed.

Progress: Over the last five years, Brunswick County, in collaboration with all participating municipalities, worked to expand upon and improve the quality of county-wide GIS data. The County will continue to work closely with municipalities to establish and maintain a robust and comprehensive GIS system. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy Shallotte P-14: Develop a database that identifies properties with damage due to hazards identified within this plan.

Progress: The Town has not been diligent in carrying out this strategy. These efforts will continue in conjunction with the County GIS. The actions defined under this locally specific strategy statement

will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Shallotte P-15: Revise the Zoning Ordinance to require the utilization of various pervious surfaces within the floodplain to reduce stormwater runoff.

Progress: This strategy was not accomplished and is being eliminated due to changing views regarding the use of permeable pavement. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-16: Establish a Stormwater Management Ordinance that will require runoff and drainage from development and agriculture activities to be of a quality as near to natural conditions as possible.

Progress: This strategy has been completed and will be enforced through future updates of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Shallotte P-17: Continue to implement a 1-foot freeboard but explore the option of instituing a 2-foot freeboard requirement.

Progress: The Town has not established a 2-foot freeboard. The 1-foot freeboard requirement will continue to be enforced and the Town will consider increasing it to 2-feet through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts
focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Shallotte P-18: Develop a Shoreline Management Plan to address the long-term issue of shoreline erosion.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-19: Establish a Shoreline Protection Committee that will work with the Town Council to solicit funds for shoreline preservation, educate the public on shoreline preservation matters, oversee preservation project development, monitor shoreline change, and report any major issues to the Board of Aldermen.

Progress: This strategy has been eliminated in an effort to establish current policy for the Town regarding shoreline stabilization and management.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-20: Encourage NCDOT to install new reflector tape or paint along road edges and in the dividing line on all major roads.

Progress: This strategy has not been accomplished locally. The Town will continue to work with the Cape Fear MPO and NCDOT to carry out this strategy through implementation of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Shallotte P-21: Place shelters every five acres in all public open space areas in order to minimize the injury from lightning strikes.

Progress: This strategy is being eliminated due to the fact that the Town is not implementing this strategy and funding is not available to carry it out.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-22: Require lightning detection devices be installed in public outdoor gathering areas such as school stadiums.

Progress: This strategy is being eliminated due to the fact that the Town is not implementing this strategy and funding is not available to carry it out.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-23: Continue to encourage proper waste disposal and recycling.

Progress: This strategy was deemed a day-to-day function of the Town, and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-24: Amend the Zoning Ordinance to prohibit underground chemical and gasoline storage, as set forth by the EPA and the NC Building Code, in an effort to minimize risks to natural resources.

Progress: This strategy has not been carried out but the Town works closely with the County LEPC and NCDEQ to enforce these standards. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Shallotte P-25: Amend the Zoning Ordinance to prohibit the storage of toxic wastes within the planning jurisdiction.

Progress: This strategy has not been carried out but the Town works closely with the County LEPC and NCDEQ to enforce these standards. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Shallotte P-26: Continue to implement a recycling program that reduces solid waste disposal that could potentially lead to natural resource contamination.

Progress: This strategy was deemed a day-to-day function of the Town, and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte P-27: Encourage intergovernmental cooperation to ensure continued pure supply of potable water.

Progress: The Town continues to work with the County water and sewer districts to ensure a continued supply of potable water. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Shallotte P-28: Maintain fire event preparedness.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continue involve continued education, training exercises, and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed

through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Shallotte P-29: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continue involve continued education, training exercises, and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Shallotte P-30: Evaluate and improve fire fighting procedures.

Progress: Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continue involve continued education, training exercises, and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC52

Strategy Shallotte P-31: Ensure the fire hydrants are working properly.

Progress: The Town public works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC52

Strategy Shallotte P-32: Maintain hazardous materials event preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Shallotte P-33: Continue to implement the recommendations in the Shallotte Thoroughfare Plan adopted in February 2002.

Progress: The Town has and will continue to work with NCDOT to implement the recommendations contained in the Thoroughfare Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Shallotte P-34: Maintain nuclear event preparedness.

Progress: Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC49

Strategy Shallotte NRP-1: Protect and enhance shoreline vegetation.

Progress: The Town has not addressed this issue locally, but will work with NCDEQ regarding shoreline protection. The actions defined under this locally specific strategy statement will continue, but are now
addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC22

Strategy Shallotte NRP-2: Continue to seek funding for implementation of the recommendations in the Waterfront Access and Development Plan.

Progress: This strategy has been deemed irrelevant to the Town's mitigation program and has been eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte NRP-3: Develop local Water Shortage Response Guidelines (in phases) as a part of the Shallotte Emergency Response Plan as it relates to the expectations of the Town's water supplier.

Progress: This effort was not completed over the last five years and has been deemed redundant to water conservation measures adopted through ordinance; therefore, it will be eliminated.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte NRP-4: Connect rainwater retention drums to downspouts of each gutter system on every municipal building within Shallotte.

Progress: This strategy was determined not to be a mitigation measure and therefore, is being eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Shallotte ES-1: Develop a tornado and waterspout warning system using the current fire alarm.

Progress: This strategy has not been completed locally, but the Town will work closely with County Emergency Management regarding this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC46

City of Southport

Strategy Southport PI-1 : Educate contractors about principles for quality redevelopment and safe housing development through written materials or a City-sponsored workshop.

Progress: The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Southport PI-2: Hold a City-sponsored hazard mitigation seminar for the community residents, including information on preparedness, mitigation, and response for all hazards significant to Southport.

Progress: The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: R7, BC1, BC5

Strategy Southport PI-3: Provide new home and property buyers with information on quality redevelopment and safe housing development.

Progress: The City's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: R7, BC1, BC45

Strategy Southport PI-4: Manually disperse and have a website posting which provides information about the City's Emergency Response Plan and relevant emergency response actions the public can take.

Progress: The City of Southport has maintained information regarding the City's existing Hazard Mitigation Plan and Emergency Response procedures on the City's website over the last five years. Upon adoption, this Regional plan will replace the existing document, and will be disseminated to the public. The City will rely on Brunswick County Emergency Management to provide detailed information regarding County Emergency Management protocol. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC45

Strategy Southport PI-5: Manually disperse and have a website posting which provides information about the City's Hazard Mitigation Plan and relevant mitigation measures that public can take. Provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The City of Southport has maintained information regarding the City's existing Hazard Mitigation Plan on the City's website over the last five years. Upon adoption, this Regional Plan will replace the existing document, and will be disseminated to the public. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: R7, BC1, BC45

Strategy Southport PI-6: The City should distribute via gas/electric bills maps of evacuation routes

which will facilitate the evacuation of Southport in case of a hazardous event.

Progress: The City has not carried out this strategy over the last five years. The City has and will continue to rely on Brunswick County Emergency Management for the dissemination of this information. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5, BC45

Strategy Southport PI-7: Work with Brunswick County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The City has not direct mailed notices to property owners regarding the Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a
result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Southport P-1: Update the City's Emergency Response Plan.

Progress: The City reviews and updates the local Emergency Response procedures in conjunction with Brunswick County Emergency Management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Southport P-2: Maintain evacuation routes in the event of a hazardous event.

Progress: The City maintains links on the municipal website to information regarding evacuation routes necessary in the event of a natural hazard event. This information is updated and maintained by Brunswick County Emergency Management and NCDPS. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Southport P-3: The City should publicize, on the City's website, maps of evacuation routes which will facilitate the evacuation of Southport in case of a hazardous event.

Progress: The City has maintained links on the municipal website to information regarding evacuation

routes necessary in the event of a natural hazard event. This information is updated and maintained by Brunswick County Emergency Management and NCDPS. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy Southport P-4: Monitor the status of backup generators, communications, and vehicles for all critical public facilities.

Progress: The Town carries out routine maintenance on annual basis through the Town's public works department. No new generators were acquired. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Southport P-5: Purchase, as necessary, backup generators as determined by the results of Action P-4.

Progress: The Town carries out routine maintenance on annual basis through the Town's public works department. No new generators were acquired. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Southport P-6: Install, as necessary, generator quick connects, as determined by the results of Action P-3.

Progress: The Town carries out routine maintenance on annual basis through the Town's public works department. No new generator quick connects were acquired. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Southport P-7: Continue to enforce the North Carolina State Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the North Carolina State Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy

statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Southport P-8: Monitor trees and branches, in public areas, at risk of breaking or falling in wind, ice, and snow storms.

Progress: The City's public works department in conjunction with local utility providers has worked over the least five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Southport P-9: The City will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The City addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC30

Strategy Southport P-10: Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the City's capability to generate maps when needed.

Progress: The City has not established a comprehensive GIS system and will work closely with the County to maintain and expand upon it. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC43

Strategy Southport P-11: Develop a database that identifies properties with damage due to hazards identified within this mitigation plan.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Southport P-12: Improve the City's tax database to include information that will distinguish property as residential, commercial, industrial, or governmental. This database should also be expanded to identify developed or undeveloped properties.

Progress: The City has completed this effort over the last five years through ongoing land use planning efforts. This database will be updated as land use patterns change over the next five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy Southport P-13: Revise the Zoning Ordinance to require the utilization of various pervious surfaces within the floodplain to reduce stormwater runoff.

Progress: This strategy is being eliminated due to the changing views regarding the use of permeable pavement as an effective method for curbing non-point source stormwater runoff. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Southport P-14: Revise Zoning and Subdivision Ordinances to incorporate shoreline vegetation protection buffers along AECs in order to protect the character and to help mitigate flooding.

Progress: Over the last five years, the City of Southport has relied on NCDEQ and existing coastal CAMA regulations to address shoreline protection measures. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Southport P-15: Revise the Zoning Ordinance and Subdivision Ordinance to increase lot sizes in areas with poor soils.

Progress: This strategy has not been carried out and is being eliminated due to a lack of political will.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport P-16: Take a more proactive approach to participation in the Community Rating System.

Progress: The City has participated in the CRS program over the last five years; however, the City will take a stronger approach to program participation through implementation of this plan update.

Status/Corresponding 2015 Strategy: BC1, BC7

Strategy Southport P-17: Develop a plan, which will include annual monitoring of erosion, to address the long-term issue of erosion using several methods of erosion prevention and control.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport P-18: Encourage NCDOT to install new reflector tape or paint along road edges and in the dividing line on all major roads.

Progress: This strategy has not been accomplished locally; however, the City in collaboration with other County participants will work with NCDOT on this issue through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC11

Strategy Southport P-19:: Continue to encourage proper waste disposal and recycling.

Progress: This strategy is considered a day-to-day function of the City and not relevant to the City's mitigation program, therefore, it will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport P-20: Amend the zoning ordinance to prohibit underground chemical and gasoline storage that are a risk to groundwater resources.

Progress: The City has not accomplished this strategy, but rather relies on Statewide regulations regarding the installation of underground storage tanks to regulate this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Southport P-21: Amend the zoning ordinance to prohibit the storage of toxic wastes within the planning jurisdiction.

Progress: The City has not accomplished this strategy, but rather relies on Statewide regulations regarding the storage of toxic waste to regulate this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Southport P-22: Encourage intergovernmental cooperation to ensure continued pure supply of potable water.

Progress: The City has worked closely with local water service providers over the least five years to ensure access to a clean and consistent potable water supply. The actions defined under this locally specific strategy

statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC2

Strategy Southport P-23: Amend the Stormwater Management Ordinance to include a list of potentially hazardous materials that should not be deposited into local drainage systems or surface waters.

Progress: The City incorporated restrictions regarding the disposal of hazardous materials into stormwater drainage basins in 2013. Enforcement of these standards continues. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Southport P-24: Maintain fire event preparedness.

Progress: The City's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises, and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Southport P-25: Explore and seek access to all potential sources of information and communication regarding early fire prevention.

Progress: The City's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises, and outreach. The actions defined under

this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35, BC52

Strategy Southport P-26: Evaluate and improve fire fighting procedures.

Progress: The City's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises, and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC35, BC52

Strategy Southport P-27: Ensure the fire hydrants are working properly.

Progress: The City's public works department works closely with the City's fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Southport P-28: Update the Disaster Response Plan.

Progress: The City reviews and updates the local emergency response procedures in conjunction with Brunswick County Emergency Management annually. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Southport P-29: Place a fireproof buffer along the railroad tracks in the City limits or ETJ.

Progress: This strategy has not been implemented due to a lack of political will.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport P-30: Limit development adjacent to the railroad tracks.

Progress: This strategy has not been implemented due to a lack of political will and the impact it would

have on development potential along these corridors; however, the City will continue to consider this strategy through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC58

Strategy Southport P-31: Maintain hazardous materials event preparedness.

Progress: The City has not completed this effort; however, City emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Southport P-32: Maintain nuclear event preparedness.

Progress: The City has worked diligently with Brunswick County Emergency Management to maintain nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC49

Strategy Southport P-33: Place the City's power lines underground.

Progress: This strategy has been eliminated due to a lack of funding and political will.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport NRP-1: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Southport Emergency Response Plan as it relates to the expectations of the City's water supplier.

Progress: The City has worked over the last five years to develop and enforce local water shortage response guidelines. The City will continue to work closely with County and Regional water supply entities to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC53

Strategy Southport NRP-2: The City should continue their proactive approach to mitigation by

connecting Rainwater Retention Drums to the downspouts of each gutter system on every municipal building within Boiling Spring Lakes. The collected water should be used to irrigate all municipal gardens, parks, lawns, and the like.

Progress: This strategy has been eliminated due to a lack of political will and funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Southport ES-1: Develop a tornado and waterspout warning system using the current fire alarm.

Progress: This strategy has not been accomplished; however, the City will continue to work closely with Brunswick County Emergency Management through the County EOP to improve upon waterspout and tornado warning mechanisms. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table
6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC46

Strategy Southport PP-1: Protection of Southport's sewer treatment plant.

Progress: This strategy is being eliminated from the plan due to vague and ambiguous language. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: Eliminated

Town of St. James

Strategy St. James P-1: Continue program for evaluation and improvement of critical facilities (public and private) – roads, bridges, water, sewer, electricity, etc. – and critical services – fire, rescue, medical, etc.

Progress: The Town has worked closely over the last five years to improve upon the stability and effectiveness of critical facilities within and adjacent to the Town of St. James. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC16

Strategy St. James P-2: Consider participation in the Community Rating System using Hazard Mitigation Plan components to fulfill application requirements.

Progress: The Town has not joined the CRS program to date. Participation in the program will be considered through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC7

Strategy St. James P-3: In cooperation with Brunswick County, review and update as necessary the Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430). Consider raising the minimum flood protection level from 1' above base flood elevation to 2' or more above BFE.

Progress: The Town continues to review/update and enforce the local Flood Damage Prevention Ordinance as required by NCDPS and FEMA. No updates have been conducted over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy St. James P-4: Employ specific provisions of the zoning ordinance to seek ways to expand the ETJ as well as the existing corporate limits to control land use.

Progress: This strategy is being eliminated from the plan due to the political restrictions surrounding this issue.

Status/Corresponding 2015 Strategy: BC10

Strategy St. James P-5: In cooperation with Brunswick County, review rebuilding activities after major storm events to determine how revisions to existing policies and procedures could help minimize repetitive losses.

Progress: The Town has worked closely with Brunswick County to establish a response and rebuilding plan that will expedite this process following natural hazard events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County- wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC13

Strategy St. James P-6: Consider an inventory of existing lots and structures within flood hazard areas to establish base flood elevation and finished 1st floor elevation.

Progress: This strategy has been accomplished through the NC Flood Maps update process. The actions defined under this locally specific strategy statement will continue, but are now addressed

through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC17

Strategy St. James PP-4: The Town will continue to actively participate in the Fire Wise program to reduce and remove debris that has the potential for fire hazards.

Progress: The Town has effectively carried out activities associated with the Firewise program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of
collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC59

Strategy St. James PP-5: The Town will continue to pursue efforts to reduce storm water runoff by draining, in advance of major storm events, the numerous retention ponds located on golf courses to reduce the amount of localized flooding.

Progress: The Town has pro-actively carried out this process over the last five years in advance of storm events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC60

Strategy St. James ES-1: In cooperation with Brunswick County, ensure adequate evacuation time in case of major hazard events. The Mayor of St. James can invoke mandatory evacuation when needed.

Progress: The Town has worked closely with Brunswick County Emergency Management to ensure that effective and accessible evacuation routes are maintained and properly advertised. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy St. James ES-2: Evaluate areas with limited evacuation capacity and pursue methods for improving capacity. The Town of St. James has the ability, in case of an emergency evacuation, to open a secondary exit route via the application of gravel to an existing drainage ditch.

Progress: The Town has worked closely with Brunswick County Emergency Management to ensure that effective and accessible evacuation routes are maintained and properly advertised. The actions defined

under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5, BC21

Strategy St. James ES-3: Evaluate flood or access problems for critical facilities and develop recommendations for protecting these facilities. Identify alternate command post sites.

Progress: Although the Town has not been able to make any substantive changes regarding critical facility vulnerability, efforts have focused on identifying needs that may be addressed through future plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through
updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3, BC5

Strategy St. James S-1: Continue debris removal program to reduce potential hazards during a hazard event.

Progress: The Town has maintained a contract with a qualified post-disaster debris removal contractor over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC38

Strategy St. James S-2: In cooperation with Brunswick County, continue to support the dredging of waterways to improve function and water quality.

Progress: The Town has supported efforts by Brunswick County and adjacent municipalities to ensure maintenance of waterways in an effort to maintain access to local inlets and waterways. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC40

Strategy St. James PI-1: Develop and implement a hazard awareness program (elevation certificates, FIRM data, bulletin on property protection measures and flood insurance, etc.) that is available through the County's website www.brunsco.net and also available through the St. James website www.townofstjamesnc.org (CRS 310/320/330/340/440).

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy St. James PI-2: Continue to educate town residents of potential effects of hurricanes and other natural disasters through the annual "Hurricane Awareness Symposium."

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, BC5

Town of Sunset Beach

Strategy Sunset Beach 1: All future community/critical facilities developed by the Town of Sunset Beach will be located outside of the defined flood hazard area. This includes all facilities required to provide daily services to Town citizens and visitors.

Progress: Although, the Town has not developed any new critical facilities over the last five years, this strategy will continue to be maintained through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16

Strategy Sunset Beach 2: Sunset Beach will work to make all community/ critical facilities disaster resistant. This effort will include the installation of storm shutters and floodproofing, where deemed necessary.

Progress: The Town received funding through an HMGP grant to install storm shutters on the Town's current municipal building. No other projects were completed, but the Town will continue to seek opportunities to improve the community's overall resiliency. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative

efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16

Strategy Sunset Beach 3: The Sunset Beach Public Works Department will monitor the Town's municipal storm drainage facilities to ensure that the system is functioning properly. This effort may require maintenance to ensure that the system is not contributing to flooding issues during substantial rain events.

Progress: The Town has maintained a pro active approach to stormwater management over the last five years. These efforts have included enforcement of local regulations and NCDENR Coastal Stormwater rules. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Sunset Beach 4: The Sunset Beach Fire Department will inspect all fire hydrants within the Town's corporate limits on a revolving schedule. Through this effort, the Town will aim to inspect each hydrant a minimum of two times per calender year.

Progress: Over the last five years, the Sunset Beach Fire Department has inspected all municipal fire hydrants on an annual basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC52

Strategy Sunset Beach 5: Sunset Beach will hold an internal coordination meeting annually during the month of May to address issues related to hurricane season. This meeting will focus on Town policies and procedures relating to preparation and response to tropical storm/hurricane/hurricane events. If deemed necessary, the public will be informed of changes to existing procedures resulting from this annual effort.

Progress: The Town has consistently maintained holding a coordination meeting in approximately May to ensure that appropriate policies and procedures are in place to address issues and potential problems associated with hurricane season. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 6: The Town of Sunset Beach police, fire, and public works departments will attend the annual Brunswick County Hurricane Symposium. The symposium addresses interagency

coordination between the Brunswick County Emergency Management Department, all County municipalities, and regional utility companies (telephone, electric, and water/sewer facility operators)

Progress: The Town has actively participated in the Brunswick County Hurricane Symposium annually over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 7: Sunset Beach will maintain a pre-disaster debris management contract with a qualified provider. The Town will review and assess this contract every three years.

Progress: Over the last five years Sunset Beach has maintained a Qualified Post Disaster Debris Management Contractor. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC38

Strategy Sunset Beach 8: The Town will continue to operate and maintain backup generators at all community/critical facilities including the Sunset Beach Fire Department, the Sunset Beach Municipal Building, and the Town's public works facility.

Progress: The Town carries out routine maintenance on an annual basis through the Town's public works department. No new generators were acquired. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC51

Strategy Sunset Beach 9: The Sunset Beach Police and Fire Department will pre-plan for necessary staffing levels in preparation for post-disaster response situations. This effort will ensure that appropriate staff support is available in the event of a tropical storm/hurricane.

Progress: The Town of Sunset Beach has worked closely with Brunswick Emergency Services to ensure proper staffing levels and procedures to effectively deal post disaster response situations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 10: The Town of Sunset Beach will consider sending the Town's floodplain

management staff members to attend the FEMA Certified Floodplain Managers course.

Progress: The Town has not accomplished this strategy, but will aim to provide this educational opportunity to floodplain management staff through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Sunset Beach 11: The Sunset Beach Police Department will continue to provide annual in-service training to officers including courses focused on: firearms, hazardous materials, blood-borne pathogens, ethics, dealing with juveniles, and domestic violence. Although all of these disciplines do not address natural hazards, continuing education assists the police department in dealing with a wide range of issues and situations.

Progress: This strategy has been deemed irrelevant to the Town's natural hazard mitigation program and therefore will be eliminated through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35

Strategy Sunset Beach 12: The Town of Sunset Beach Fire Department will continue to provide annual training to all firefighters on staff. This training will focus on improving upon response times and dealing with issues resulting from man-made and natural disaster situations.

Progress: The Town of Sunset Beach has provided training to all fire department staff regarding a range of functions focused on response and the minimization of damage relating to future events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35

Strategy Sunset Beach 13: The Town of Sunset Beach will provide funding for all staff members/departments to secure certifications and continuing education including building inspections, floodplain management, fire service training, police department training, and emergency management training.

Progress: Over the last five years, the Tow has provided funding for continuing education efforts addressing a range of issues. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2).

This change is a result of collaborative efforts focused on developing an effective Regional plan with

effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC35

Strategy Sunset Beach 14: The Town of Sunset Beach will review the Town's Flood Damage Prevention Ordinance annually to ensure that the document is consistent with the latest FEMA and NCEM standards.

Progress: The Town has not updated the local Flood Damage Prevention Ordinance over the last five years; however, an update will be carried out in conjunction with the adoption of updated flood maps. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9

Strategy Sunset Beach 15: The Town of Sunset Beach will continue to require elevation certificates for all development within the defined A, AE, and VE flood hazard areas.

Progress: The Town has required the provision of elevation certificates for all structures located within the defined flood hazard area. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC9, BC14

Strategy Sunset Beach 16: The Town of Sunset Beach will conduct on-site fire inspections on all non-residential structures a minimum of once annually.

Progress: The Sunset Beach Fire Department has pro-actively inspected all non-residential structures over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Sunset Beach 17: The Town of Sunset Beach will continue to enforce the NC State Building Code.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result
of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Sunset Beach 18: The Town will consider working with regional partners on the development and adoption of legislation that will enable the Town to enforce the wind-borne debris International Building Code standards throughout the Town's corporate limits (enabling the Town to secure a CRS rating lower than 8).

Progress: This strategy is being eliminated through this plan update due to the political viability of successfully carrying out this strategy.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 19: The Town will establish funding to work through a comprehensive update of all land development ordinances.

Progress: Over the last five years, the Town has worked through a comprehensive update of all local land development regulations. These standards will continue to be reviewed on an annual basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 20: Sunset Beach will continue to work closely with the Brunswick County Emergency Management Department on improving the County's multi-jurisdictional communications system in an effort to enhance interoperability. The Sunset Beach Fire Chief will attend bi-monthly meetings with the County Emergency Management Department to address this issue.

Progress: The Town of Sunset Beach has worked closely over the last five years with Brunswick County Emergency Services to improve upon regional communication systems. These efforts have resulted in the purchase of new radio technologies which will improve upon communication redundancy. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 21: The Town of Sunset Beach administration and Town Council will advocate the establishment of an 800 MHz communication system for the County, as well as all municipalities. Establishment of this system will make the County compatible with the latest communications technology and will alleviate many of the issues present in dealing with the existing system.

Progress: The County has acquired this system over the last five years, and has incorporated the Town of

Sunset Beach into this communications framework. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC50

Strategy Sunset Beach 22: The Town of Sunset Beach will research the feasibility of establishing an internal communication system that operates independent of the existing County-wide infrastructure.

Progress: This strategy has been deemed unnecessary and therefore will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 23: The Town of Sunset Beach will participate in scheduled conference calls with the County Emergency Operations Center as the imminent threat of severe weather approaches. The call will be scheduled by the County Emergency Management Department and all town departments should be represented.

Progress: The Town of Sunset Beach has carried out this strategy over the last five years through participation in the Brunswick County Emergency Operations Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 24: The Town of Sunset Beach will maintain an internal early warning system to assist in notifying town residents of issues related to natural and man-made hazards. The maintenance of this system should involve an outreach effort to ensure that all residents have their telephone numbers registered in the notification system.

Progress: The Town of Sunset Beach has determined that implementation of a local system will be redundant to the County's Code Red emergency notification system; therefore, this strategy will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 25: The Town will review and update hurricane re-entry and evacuation procedures on an annual basis.

Progress: The Town of Sunset Beach has pro-actively reviewed these policies over the last five years as a component of the County Emergency Operations Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 26: The Sunset Beach Town Council will maintain a staff level Public Information officer charged with disseminating information relating to threats associated with man-made and natural disasters. The Public Information Officer's role and duties are defined within the Town's Hurricane Operations Plan.

Progress: The Town has maintained a designated Public Information Officer charged with disseminating information regarding impending inclement weather and natural hazard events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 27: The Town of Sunset Beach will provide information relating to natural and man-made disaster situations through all available outlets including news media, the Town's website, and the Town's emergency notification system.

Progress: This strategy has been deemed irrelevant to the Town's Mitigation Program and will be eliminated through this update. This issue will be handled through functions carried out by the Brunswick County LEPC.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 28: Sunset Beach will maintain a policy of patrolling portions of the Town under mandatory evacuation procedures as the threat of severe weather approaches. This effort will ensure that all residents and visitors within those areas are clearly aware of the evacuation order and will respond accordingly.

Progress: The Town of Sunset Beach has pro-actively carried out this strategy as a function of local emergency management procedures over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 29: The Town will work with local media outlets as well as the Brunswick County Emergency Management Department to promote the importance of hand-held NOAA weather radios. These radio systems provide efficient and prompt notice of approaching severe weather.

Progress: Through Town Hall and other local outreach mechanisms, the Town has promoted the importance an effectiveness of citizens acquiring and utilizing NOAAS weather radios over the last five

years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 30: As stated previously, the Town of Sunset Beach will establish funding to work through a comprehensive update of all land development ordinances. This effort will include a review of local stormwater and sedimentation control regulations.

Progress: Over the last five years, the Town has worked through a comprehensive update of all local land development regulations. These standards will continue to be reviewed on an annual basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 31: The Town of Sunset Beach will continue to require that all development occurring along Main Street must be located within 150 feet of the property line abutting the right-of-way. This strategy is intended to protect the primary frontal dune structure running the extent of the Island.

Progress: The Town has maintained this ocean front setback requirement through both the local CAMA Land Use Plan and Zoning Regulations over the last five years. Enforcement of this standard will continue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 32: In working through the revisions of the Town's land development ordinances, the Sunset Beach Planning Board and Town Council will consider increasing the amount of open space required for all subdivisions with ten or more subdivided lots.

Progress: Over the last five years, the Town has worked through a comprehensive update of all local land development regulations. These standards will continue to be reviewed on an annual basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 33: The Town will continue to impose its impervious surface limits whereby a

property owner must installed an on-site stormwater retention and/or detention facility if the total impervious surface area exceeds 30% of a given site. These systems must be designed to retain all runoff generated by the impervious coverage in excess of the stated 30%.

Progress: This strategy was incorporated into Land Development Regulation updates completed over the last five years. The Town will continue to enforce this standard through implementation of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Sunset Beach 34: The Town of Sunset Beach will continue to work with Brunswick County on the enforcement of their Stormwater Management Ordinance.

Progress: The Town has worked closely with the Brunswick County Planning and Public Works Department to pro-actively enforce County stormwater regulations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC6

Strategy Sunset Beach 35: The Town of Sunset Beach will continue to work with the NC Department of Environment and Natural Resources on the enforcement of the NC Statewide Stormwater Management Program.

Progress: The Town has worked closely with the NCDENR to pro-actively enforce State Coastal stormwater regulations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC25

Strategy Sunset Beach 36: The Town of Sunset Beach will maintain a policy of supporting single-family residential development as a desired land use pattern. Residential density and the establishment of non-residential land uses will be significant issues discussed while working through the revision of the Town's land development ordinances.

Progress: The Town has clearly stated this policy in locally adopted land use planning documents. Through implementation of this plan, the Town will maintain the policy of promoting single-family residential development both on and off island. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 37: The Town of Sunset Beach will assist property owners in applying for post-disaster mitigation funding for acquisition/relocation grant programs following a natural disaster.

Progress: The Town, over the last five years, has maintained a pro-active approach to addressing repetitive loss properties through funding provided through the HMGP program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC23

Strategy Sunset Beach 38: The Town of Sunset Beach will work closely with Brunswick County Emergency Management to maintain clear and accurate records regarding expenses related to post-disaster recovery and clean up. This effort will be focused on ensuring that the Town may recover expenses relating to the disaster situation.

Progress: The Town maintains a policy of establishing clear and accurate records regarding post disaster clean up. Although, this has not been required over the last five years, it is a mandatory practice to ensure proper reimbursement regarding storm clean up. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 39: Sunset Beach will seek out grant funding for the installation of storm shutters on the Town's fire department facility.

Progress: This strategy was completed in 2011, and will be eliminated through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through
updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Sunset Beach 40: Sunset Beach will seek grant funding for the acquisition of internal communication system equipment. This effort will work towards the goal of improving upon the Town's emergency response capabilities.

Progress: As stated earlier, the Town has determined that this system will be redundant to the improved County communication system; therefore, it will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 41: Sunset Beach will seek grant funding to acquire equipment needed to provide comprehensive ocean rescue services.

Progress: The Town acquires ocean rescue equipment as necessary through annual budgetary considerations. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC3

Strategy Sunset Beach 42: The Town of Sunset Beach will update its website to include more comprehensive information relating to emergency response and mitigation. This information will cover a wide range of topics including: evacuation procedures, mitigation options, floodplain protection, emergency preparedness, and special needs registry efforts.

Progress: The Town has worked to improve its website consistently over the last five years. These efforts have included expanding upon information regarding Hazard Mitigation and Emergency Management. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC1, BC5

Strategy Sunset Beach 43: Sunset Beach will continue to provide information to citizens following a natural hazard event that outlines the policies regarding evacuation, re-entry, and recovery. This information will be updated annually as procedures change over time.

Progress: The Town of Sunset Beach reviews these policies annually as a component of the County's Emergency Operations Planning efforts. The Town reviews this issue annually, and updates are made as necessary. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 44: Sunset Beach will maintain information at the local library relating to floodplain protection and mitigation. This effort will be carried out as part of the Town's Community Rating System (CRS) program.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a

library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Sunset Beach 45: The Town will continue to mail out a Town newsletter quarterly. As an element of this newsletter, the Town will include information relating to emergency preparedness.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1, Table 6-5 (page 6-40)

Strategy Sunset Beach 46: The Town of Sunset Beach will continue to provide day-to-day counseling services to contractors and property owners regarding floodplain protection and mitigation practices. This effort will include site visits when deemed necessary.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

Strategy Sunset Beach 47: The Town of Sunset Beach will continue to maintain all publicly-owned streets in a manner that will provide efficient and safe ingress and egress for all citizens. Additionally, the Town will maintain a policy of accepting private streets for maintenance assuming those streets are developed to appropriate standards.

Progress: The Town of Sunset Beach Public Works Department has worked diligently over the last five years to carry out this strategy. These efforts will continue through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC21

Strategy Sunset Beach 48: The Town of Sunset Beach will incorporate language into the Town's ordinance requiring all new gated communities to provide clear and adequate access for emergency service vehicles.

Progress: This strategy was completed in conjunction with the Zoning Ordinance update referenced previously; therefore, it will be eliminated through this update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 49: The Town of Sunset Beach will factor protection from natural hazards into discussions involving the update of the Town's land development ordinances. This effort is expected to be completed within the next two years.

Progress: Over the last five years, the Town has worked through a comprehensive update of all local land development regulations. These standards will continue to be reviewed on an annual basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC10

Strategy Sunset Beach 50: The Town will maintain a dialogue with regional electric service providers, as well as water and sewer service providers in an effort to better prepare for the impacts associated with natural hazard events.

Progress: The Town meets annually prior to Hurricane Season to effectively address this issue with regards to potential natural hazard events. This has been carried out over the last five years, and will continue through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6- 2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 52: The Town of Sunset Beach will adopt this HMP and work towards the implementation of all strategies. Additionally, the Town will maintain good standing with both the NFIP and CRS programs.

Progress: Through implementation of the Town's existing plan, this strategy has been effectively carried out.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Sunset Beach 53: The Town of Sunset Beach will factor all projects outlined in these strategies into annual budget discussions. Some of the equipment and facility improvements

proposed in this plan may require local investment.

Progress: The Town of Sunset Beach considers all recommendation regarding capital expenditures outlined in this plan during annual budget deliberations. This has taken place through implementation of this plan over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC16

Strategy Sunset Beach 54: The Town of Sunset Beach will work closely with the Brunswick County Emergency Management Department to ensure that citizens and visitors have safe and efficient access to shelter facilities.

Progress: The Town has worked with and supported Brunswick County Emergency Management in addressing this issue over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Strategy Sunset Beach 55: The Town will inform citizens of shelter locations and policies through the following: posting on the Town's website, materials provided when receiving re-entry permits, the Town's quarterly newsletter, the Town's designated Public Information Officer.

Progress: The Town has worked with and supported Brunswick County Emergency Management in addressing this issue over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC5

Town of Varnamtown

Strategy Varnamtown P-1: Update Land Use Plan.

Progress: The Town did not update the Land Use Plan over the last five years. The Town will consider this effort through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC8

Strategy Varnamtown P-2: Ensure that mobile/manufactured homes are installed and secured properly.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and

adopt amendments and changes as required. All manufactured homes are tied down in accordance with NC State Building Code. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6- 2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Varnamtown P-3: Continue to encourage NC State Building Code enforcement for wind restriction.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. All manufactured homes are tied down in accordance with NC State Building Code. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6- 2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC28

Strategy Varnamtown S-1: Support Brunswick County debris removal program to correct problem sites.

Progress: The Town has pro-actively supported Brunswick County efforts to address the issue of debris removal following natural hazard events. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC38

Strategy Varnamtown S-2: Support the dredging of waterways to improve function and water quality.

Progress: The Town has supported the efforts of the US Army Corps of Engineers to maintain clear and passable waterways through selective dredging efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-2). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: BC40

Strategy Varnamtown S-3: Support the Brunswick County Appearance Commission.

Progress: This strategy has been eliminated from the plan because this strategy is not considered a mitigation measure.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Varnamtown PI-1: Continue to provide flood maps for staff and public use.

Progress: The Town's Planning Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: BC1

NEW HANOVER COUNTY MITIGATION PROGRESS REPORT

The following provides a summary of progress achieved with regard to the strategies adopted through the 2010 New Hanover County Multi-Jurisdictional Hazard Mitigation Plan.

New Hanover County

Strategy 1: Maintain the County's Continuity of Government Plan (COOP) by ensuring that updates are completed by all county departments at least twice a year. In FY2004, the County received grant funding to develop a COOP for the 8 departments most critical to hazard response in the County government. In order for the County to be completely prepared, all departments must be included in the COOP, which also needs to be exercised.

Progress: The COOP was revised and updated to include all County departments in January 2005; the COOP was exercised in August 2005. A web-based system that allows county departments to update their plans on the web was developed in 2008. Department's COOP checklists are updated at least twice per year. In May 2012, these checklists were moved to the County's SharePoint site. Through this planning process, this strategy will now apply to all participating municipalities who request assistance from the County in establishing their own respective COOP (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC1

Strategy 2: Enhance the survivability of critical IT services by installing redundant capability ("hot site") at our remote operating site. Conduct a risk analysis of IT systems to include Business Continuity Planning, Facilities Management, Security and other Emergency Management Issues.

Progress: Funding was secured in the new building project to mitigate some of the risks that we had in the old computer room. We now have a data center that has fully redundant power including a backup generator with a 72 hour tank. This will allow us to operate the computer room during emergency events. In 2012, we also completed a project to create redundant paths for our fiber optic network which connects the main county facilities (Judicial Building, DSS, Health, and Government Center). This gives us fail over in case of a fiber break along one of the paths. In fiscal year 2007/2008, IT conducted meetings with County Departments to assess the criticality of applications and services hosted by the department. The result of these meetings was a budget plan for the next three years to address vulnerabilities to the County's most critical applications and services. Completion of the plans will be contingent on budgetary funding. Through this planning process, this strategy will now apply to all

participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC2

Strategy 3: Install permanent generators to all five emergency shelters. Pursue funding for a permanent generator at the New Hanover County Senior Center. Currently, the 5 County school shelters have transfer switches, as does the Senior Center. However, the County has no facility with a permanently installed generator that can be activated as a shelter on short notice. The County's priority is to have permanently installed generators at all 5 school shelters, the senior center and the animal shelter.

Progress: Permanent generators have been installed at Johnson Pre-K Center, Noble Middle, Eaton Elementary, Codington Elementary, and Trask Middle Schools, completing the plan to install permanent generators at all five of NHC's emergency shelters. Permanent generators have been installed at the New Hanover County Animal Services Unit and the Cape Fear Museum.

Status/Corresponding 2015 Strategy: NHC3

Strategy 4: Install microwave links between the County radio system and the 911 system. The County has no communications redundancy. This project would install microwave links between the 911 center and the 2 communications towers that provide countywide coverage, and between the 2 communications towers.

Progress: This was completed prior to November 1, 2006.

Status/Corresponding 2015 Strategy: Completed

Strategy 5: Continue to promote rip current awareness within the county by partnering with various beach services and the National Weather Service. Emphasis should be placed on educating children, the local public and tourists. The County has 3 Atlantic beaches which frequently experience RIP currents. Public notification of rip current location in real time in the form of Public Service Announcements and signage at beach access points would increase awareness of the hazard.

Progress: New Hanover County was the test site for the east coast of the U.S. RIP Current Advisory Strategies Team developed the initiatives, such as posters in all classrooms in the County, and signage at all 3 beaches. All initiatives completed prior to summer 2006. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC4

Strategy 6: Drainage project at Crosswinds Subdivision. Houses are being flooded & damaged from floodwaters during rain storms much smaller than major events. Streets are flooded preventing access by emergency and other vehicles. This project would enlarge & install pipe in the drainage outfall to allow larger storms to drain.

Progress: This has not been done. No funds have been identified.

Status/Corresponding 2015 Strategy: NHC5

Strategy 7: Buyout of house located in Crosswinds subdivision adjacent to drainage ponds. This house is not in a 100-year floodplain, and yet it has sustained repetitive losses from periodic flooding. Since it is not eligible for buyout under FEMA regulations, we would like to use other funds to acquire this property.

Progress: This has not been done. No funds have been identified.

Status/Corresponding 2015 Strategy: NHC12

Strategy 8: Retrofit/Elevation Projects for 5 Wastewater pumping stations (80, 81, 48, 92 & 35). All 5 of these pumping stations (#80, 81, 48, 92, and 35) are located in the 100 year floodplain and routinely flood during hurricane hazards such as flooding and storm surge. For each pump station, the top of the pump station wetwell, the valve box & the control panel slab will be raised above elevation of 12.5 msl.

Progress: Preparation of the next edition of the Authority Master Plan is on hold pending completion of the City and County Comprehensive Plans and the CAMA Plan Update. The next edition of the Authority Master Plan will address sea level rise relative to facilities. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC7, NHC12

Strategy 9: Beaver Management Program - The Beaver population of New Hanover County has been rapidly increasing. Detrimental impacts include damage to roads, drainage systems, landscape plantings & other property.

Progress: NHC has a current contract with the U.S. Department of Agriculture for beaver and beaver dam removal in New Hanover County drainage ways. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC8

Strategy 10: Update flood maps to accurately reflect changes in elevation and flood patterns due to natural or man-made forces. New Hanover County has experienced rapid development over the past 10 years, resulting in changes in the course of streams and coastal waters, altering the shape of the floodplain. Remapping and correcting flood maps on a regular basis will allow County officials to plan appropriate land uses for flood prone areas.

Progress: New Hanover County and its municipalities are currently in the preliminary comment period and anticipate adoption of new Special Flood Hazard Data soon after adoption of this plan. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC9

Strategy 11: Revise Stormwater Management Ordinance. The County passed a storm water management ordinance on September 30, 2000 in order to regulate storm water runoff. However, development prior to 9/30/2000 was not required to manage storm water. Additionally, no systematic method for storm water management exists. And, there is no mechanism for ensuring that storm water construction projects to mitigate the effects of storm water runoff are funded. A utility would provide county wide storm water management including retrofitting areas without any storm water collection system.

Progress: The revision of the ordinance has not been made yet and there is no status change on creating a Stormwater Utility. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC10

Strategy 12: Hire a consultant to identify critical facility structures for susceptibility to hazard damage & set a priority schedule for retrofitting. New Hanover County has completed a critical facilities inventory. A vulnerability assessment has been conducted on the entire system, including plants, pump stations, lines and manholes based on multiple scenarios of sea level rise and storm events. However, we need to have current information relative to an estimated cost for retrofitting each one.

Progress: New Hanover County, City of Wilmington and CFPUA received an allocation for technical assistance provided by FEMA and EPA in order to assess the area's water and sewer vulnerability to sea level rise and storm surges. A consultant was hired to conduct that analysis, a 2-day workshop was held with key staff to provide input into the vulnerability assessment and adaptation (mitigation) strategies and a final report along with inundation modeling data was delivered in March 2013. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC11, NHC12

Strategy 13: Retrofit the Government Center to wind and seismic standards. The County Administrative Annex has been moved to a new building at 230 Government Center Drive. The building used to house a retail store and was converted to office space. However, the building does not meet current standards for wind and seismic hazards.

Progress: This project has not yet been budgeted. No funds have become available for which this project would be eligible. Priority should be changed to Low at this point.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 14: Complete open space plan that gives major consideration to hazard vulnerability for conservation and acquisition. New Hanover County's coastal waters & floodplains are some of the most sought after lands for development. These same lands provide valuable buffers between the water and residential development. Preserving these lands as open space would eliminate future

development and potential catastrophic losses of private property.

Progress: The County adopted the Wilmington-New Hanover County Comprehensive Greenway Plan on March 11, 2013. This plan gives major consideration to hazard vulnerability for conservation and acquisition. The County is also working toward buying highly vulnerable properties and using those properties for open space. In 2012, the County received a sub-grant award from the Nature Conservancy to purchase a 10-acre tract of land on Smith Creek that is primarily within the 100-year floodplain and partially comprised of wetlands. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC18, NHC19, NHC20, NHC21

Strategy 15: Continue acquisition, elevation &/or retrofitting of hazard prone properties. Notify repetitive loss property owners to see if they are interested in participating in future programs. New Hanover County has 289 repetitive loss properties.

Progress: The County has sent notices to repetitive loss and severe repetitive loss property owners to educate them of the options available to them. Additional properties have not been acquired, elevated or retrofitted since adoption of the Hazard Mitigation Plan. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC12

Strategy 16: Develop & conduct a public awareness campaign emphasizing the economic benefits of participation in the CRS program.

Progress: Public information concerning the economic benefits of participation in the CRS has been created and is available on the County's website. This information is also included on a mailing sent to all residents who own property in the special flood hazard area in New Hanover County. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC13

Strategy 17: Develop & conduct a public awareness campaign regarding potential hazards of urban/wildfire interface.

Progress: New Hanover County Fire Services' public awareness campaign is ongoing. A video was developed and is shown on the County's cable TV station. New educational materials are continually being generated. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC14

Strategy 18: Ensure that standards for Firewise Communities/USA are routinely included in subdivision review process, i.e., addressed in local subdivision ordinance.

Progress: This is an ongoing process that is an important part of the Subdivision Review Process.

Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC15

Strategy 19: Flooding has led to septic failures in many areas. Specific areas where study is most necessary: Monterey Heights, Middle Sound, Murrayville Road (new school site), Castle Hayne, Masonboro Sound, and Hwy. 421 south of Echo Farms subdivision.

Progress: New Hanover County applied for and is currently approved to receive a loan from the NC Clean Water Revolving Fund Program in order to install sewer in the Marquis Hills and Heritage Park areas of the County. The County also plans to apply for grant funds to supplement this project. Construction is anticipated to begin within one year. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6- 3).

Status/Corresponding 2015 Strategy: NHC5, NHC10, NHC16

Strategy 20: Utilize NHC TV for public service announcements. Education program would advise residents of actions they can take to help prevent flooding in their neighborhoods or on their property. Showing a video on County Cable Channel would be a good mechanism for getting the word out.

Progress: NHC TV is utilized for many different purposes including educating the public about flooding and hazard mitigation. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC17

Strategy 21: Discourage high intensity uses and large structures from being constructed within the 100-year floodplain (1% annual chance floodplain), erosion prone areas, and other locations susceptible to hurricane and flooding hazards.

Progress: The New Hanover County Zoning Ordinance continues to not allow High Density development within the 100 year floodplain. Through the County's Exceptional Design Zoning District, development of any kind is not allowed in the 100 year floodplain in this district. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC18, NHC21

Strategy 22: Following a storm event, take advantage of opportunities to acquire or purchase land located in storm hazard areas which are rendered unbuildable or have sustained substantial damage. The property should satisfy objectives including, but not limited to the conservation of open space and scenic areas and the provision of public water access.

Progress: The County continues to provide outreach to citizens following storm events to make them aware of pre and post disaster grant opportunities. There have not been any significant storm events this year that have rendered land unbuildable or that have caused substantial damage to structures.

Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC19

Strategy 23: Declare a moratorium on the acceptance of any request for rezoning in flood prone areas other than for rezoning to a less intense use.

Progress: The County continues to discourage high density development in the floodplain within the New Hanover County Zoning Ordinance. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: Eliminated

Strategy 24: Declare a moratorium on the permitting of any new construction, new utility hook-ups, or redevelopment construction that would increase the intensity of the land use existing in disaster prone areas.

Progress: The County continues to discourage high density development in the floodplain within the New Hanover County Zoning Ordinance. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: Eliminated

Strategy 25: Request that new assessments of hazard areas be performed periodically due to the changes to the floodplain, shoreline and inlets caused by natural and man-made forces.

Progress: New Hanover County has received preliminary data on updated Special Flood Hazard Areas, and will be working on a public outreach program throughout 2014 to introduce these new SFHA's. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC20

Strategy 26: Limit density to 2.5 units/acre or less in areas classified as conservation on the CAMA land use map (including areas in the 100 year, or 1% annual chance floodplain). Develop a program for density tradeoffs to encourage development outside the floodplain.

Progress: The County continues to discourage high density development in the floodplain within the New Hanover County Zoning Ordinance. Density is limited within the conservation land classification to 2.5 units/acre or less. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC21

Strategy 27: Maintain annual review process for New Hanover County Health Department's (NHCHD) Preparedness Plans to include the NHCHD Emergency Response, Community Containment, Mass Prophylaxis, Pandemic Influenza, Strategic National Stockpile and Local Receiving Site plans, the

Response Plans Development Review policy and the Epidemiology (EPI) Team Policy.

Progress: NHCHD maintains a review process policy and reviews the Emergency Operations Plan and Annexes on an annual basis, other preparedness plans are reviewed annually. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC22

Strategy 28: Install upgraded generator in Health Department located at 2029 S. 17th St. Wilmington, NC 28401.

Progress: New Hanover County Property Management upgraded the Health Department's generator capacity in October 2009. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: Completed

Strategy 29: National Incident Management System (NIMS) training for County personnel which includes ICS 100, ICS 200, ICS 300, ICS 400, IS 700, and IS 800.

Progress: NIMS Training is required for County personnel. Based on the 2012 report, over 90% of required NIMS courses have been completed. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC23

Strategy 30: Sustain radio communications system through maintenance contracts and system upkeep. Enhance capabilities by upgrading current software to latest version and addition of integrated voice and data (IV&D) features.

Progress: The radio system has been sustained through regular maintenance contracts and software refreshes. Funding has not been allocated to upgrade to integrated voice and data (IV&D) features. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: NHC24

Strategy 31: Potential consideration to relocate Wrightsville Beach Elementary School from the barrier island where it is currently located to the mainland. Wrightsville Beach Elementary School is located on a barrier island off of the coast of New Hanover County, NC. The relocation of the school to the mainland would mitigate potential structural damage and may prevent (mitigate) loss of service resulting from hurricanes, flooding, tsunamis, and nor'easters. School was closed for 6 months following Hurricane Fran in 1996.

Progress: WBES is not under consideration for relocation at this time. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: Eliminated

Strategy 32: Potential consideration to relocate Carolina Beach Elementary School from the barrier island where it is currently located to the mainland. Carolina Beach Elementary School is located on a barrier island off of the coast of New Hanover County, NC. The relocation of the school to the mainland would mitigate potential structural damage and may prevent (mitigate) loss of service resulting from hurricanes, flooding, tsunamis, and nor'easters.

Progress: CBES is not under consideration for relocation at this time. Through this planning process, this strategy will now apply to all participating municipalities as well as unincorporated New Hanover County (see Table 6-3).

Status/Corresponding 2015 Strategy: Eliminated

Town of Carolina Beach

Strategy CB 1: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop.

Progress: The Planning and Development Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintains a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC25, NHC26

Strategy CB 2: Hold a Town-sponsored hazard mitigation seminar for the community residents, including information on preparedness for all hazards significant to Carolina Beach.

Progress: The Planning and Development Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintains a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC13, NHC14, NHC17, NHC25, NHC26, NHC28

Strategy CB 3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the Town hall

and other community owned, public facilities in Town.

Progress: The Planning and Development Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The department also maintains a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC13, NHC25

Strategy CB 4: Manually disperse and have a website posting which provides information about the Town's Emergency Response and Re-Entry Plan and relevant emergency response actions the public can take. Also, ensure each Town department possesses a clear list of department responsibilities as outlined in the plan. Update department contacts as they change.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC26, NHC27, NHC28

Strategy CB 5: Manually disperse and have a website posting which provides information about the Town's Community Based Hazard Mitigation Plan and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions on the plan.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC26, NHC27, NHC28

Strategy CB 6:Update the Town of Carolina Beach Emergency Response & Re-Entry Plan on an annual basis. The Emergency Response & Re-Entry Plan should contain detailed information on responsible parties and contact information; this information should be updated as positions and contact information changes.

Progress: The Town reviews and updates the local emergency response procedures in conjunction with New Hanover County emergency management annually. The actions defined under this locally specific

strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC27

Strategy CB 7: Maintain evacuation routes in the event of a hazardous event.

Progress: Evacuation routes are reviewed and updated annually as necessary through mandated County Emergency Operations Plan updates in collaboration with NCDPS. The County/Town will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC27, NHC29, NHC30

Strategy CB 8:The Town should publicize, on the Towns website, maps of evacuation routes which will facilitate the evacuation of Carolina Beach in case of a hazardous event.

Progress: All evacuation routes have been mapped by the New Hanover County GIS department and are reviewed and updated annually as needed. The County/Town will continue to address this issue through annual Emergency Operations Plan updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC30

Strategy CB 9: The Town should distribute via water bills and Town newsletters, maps of evacuation routes which will facilitate the evacuation of Carolina Beach in case of a hazardous event.

Progress: The Town has carried out this strategy annually over the last five years as a function of the Town's CRS program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC26, NHC30

Strategy CB 10: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through

updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC3, NHC24, NHC32

Strategy CB 11: Purchase, as necessary, backup generators as determined by the results of Action 10.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC3, NHC32

Strategy CB 12: Install, as necessary, generator quick connects, as determined by the results of Action 10.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generator quick connects were acquired during the implementation period. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC3, NHC32

Strategy CB 13: Revise the CAMA Land Use Plan (1997, 8-35) strategy to consider a policy to prohibit redevelopment in high hazard areas.

Progress: This strategy was not carried out over the last five years; however, due to updated CAMA planning regulations, the Town will consider revision to the Land Use Plan through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18, NHC21

Strategy CB 14: Revise the CAMA Land Use Plan (1997, 8-36) to include training for those persons in charge of the "building permit triage" to prevent the issuance of permits in areas where permits should not be issued.

Progress: This strategy was not carried out over the last five years; however, due to updated CAMA planning regulations, the Town will consider revision to the Land Use Plan through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3).

This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18, NHC21

Strategy CB 15: Continue to enforce the North Carolina State Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the North Carolina State Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC6

Strategy CB 16: Monitor trees and branches in public areas at risk of breaking or falling in wind, ice, and snow storms. Prune or thin trees or branches when they would pose an immediate threat to property, utility lines or other significant structures or critical facilities in the Town.

Progress: The Town's Public Works department in conjunction with local utility providers has worked over the last five years to maintain clearance from power lines and critical facilities. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC33

Strategy CB 17: The Town will take a proactive approach in investigating dangerous damaged structures and should take prompt action in condemning damaged structures that have been abandoned.

Progress: The Town addresses this issue on an ongoing basis due to shoreline migration and erosion. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result

of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy CB 18: Purchase a complete GIS/GPS setup and provide training on said setup to all pertinent town personnel.

Progress: The Town has completed the acquisition and installation of a comprehensive town-wide GIS

system. The Town will continue to work closely with the County to improve upon the functionality and effectiveness of this program.

Status/Corresponding 2015 Strategy: Completed

Strategy CB 19:Record and maintain all tax parcel information and floodplain locations in a GIS system in order to build the Towns capability to generate maps when needed.

Progress: The Town has completed the acquisition and installation of a comprehensive town-wide GIS system. The Town will continue to work closely with the County to improve upon the functionality and effectiveness of this program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC2

Strategy CB 20: Develop a database that identifies each property that has received damage due to hazards identified within this mitigation plan. The database should also include a tax identification number of the property, a description of the property damage, the value of the damage, and links to photographs of the damage.

Progress: The Town addresses this issue on an ongoing basis. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy CB 21: Revise the Zoning and Subdivision Ordinance to require the utilization of various pervious surfaces within the floodplain in order to reduce stormwater runoff. This should include utilizing the use of various pervious surfaces in parking lots in recreational areas near the floodplain.

Progress: The Town has not accomplished this strategy; however, the Town will consider changes to land development regulations that will assist with mitigation efforts. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in

the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18, NHC21

Strategy CB 22: The Town should support the policy identified in the CAMA Land Use Plan (1 997, 8-3), "Development will be "discouraged" in locations where stormwater runoff related flooding exists, unless appropriate corrective improvements are to be completed as part of the project."

Progress: Over the last five years, Town staff have informed residents and developers of this issue;

however, the CAMA Land Use Plan does not enable the Town to restrict development outside of defined Areas of Environmental Concern. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18

Strategy CB 23: Protect/Enhance Shoreline Vegetation (Already required by CAMA in the estuarine area). The Town should revise its zoning and subdivision ordinance to incorporate shoreline vegetation protection buffers along the AEC's and Canals in order to protect the character and to help mitigate flooding.

Progress: This strategy has not been accomplished. The Town relies on CAMA as well as other NCDEQ regulations to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18

Strategy CB 24: The Town will seek to elevate flood-prone structures. Specifically structures that are identified as repetitive losses in the area. It is understood that funding through FEMA under the HMGP and FMA programs are voluntary, as a result all elevations will be based on funding availability, political will, and private property initiative.

Progress: Over the last five years, Carolina Beach has elevated one single-family residential homes. The Town will continue to maintain a pro-active stance regarding structural mitigation. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy CB 25: Continue to prioritize beach nourishment as a means of mitigating coastal beach erosion.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 26: Develop a Beach Management Plan which will include annual monitoring of literal drift erosion, to address the long-term issue of beach erosion.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this

strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 27: Establish a Shoreline Protection Committee that will work closely with the Town Council to solicit funds for beach preservation projects, educate the public on beach preservation matters, oversee re-nourishment project development, monitor shoreline change and report any major issues to the Town Council.

Progress: Due to the rapidly involving funding and logistical issues related to shoreline management, this strategy is being eliminated from this update and will be handled on an annual basis through local Capital Improvements funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 28: Work with New Hanover County officials and surrounding communities to distribute materials about the County Water Shortage Response Plan.

Progress: The Town has not direct mailed notices to property owners regarding the Water Shortage Response Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC34

Strategy CB 29: Develop local Water Shortage Response Guidelines (in different phases) as a part of the Carolina Beach Emergency Response Plan as it relates to the expectations of the Town's water supplier.

Progress: This effort was not completed over the last five years and has been deemed redundant to water conservation measures adopted through ordinance in 2007; therefore, it will be eliminated. The actions
defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 30: The Town should continue their proactive approach to mitigation by connecting Rainwater Retention Drums to the down spouts of each gutter system on every municipal building within Carolina Beach.

Progress: This strategy has been eliminated due to a lack of funding and staffing for the installation and maintenance of these systems.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 31: Develop a tornado and waterspout warning system.

Progress: The Town has accomplished this strategy through the local fire department. Several staff members are currently trained in early detection. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC17, NHC24, NHC26, NHC30

Strategy CB 32: To improve road visibility, encourage the Department of Transportation to place new reflector tape or paint along road edges and in the dividing line. This should be done on all major roads through Town.

Progress: The Town continues to collaborate with the County and NCDOT to address this issue. Some progress has been made; however, it continues to be an issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the Regional Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC29

Strategy CB 33: In order to minimize injury from lightning strikes, shelters should be placed every five acres in all public open space areas. This recommendation should be incorporated into the zoning and subdivision ordinances.

Progress: This strategy has been eliminated from the plan. This decision was based on the fact that the recommended standard was deemed too costly, and ultimately proved to be an unrealistic recommendation.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 34: The Zoning Ordinance should require that lightning detection devices be installed in public outdoor gathering areas such as school stadiums.

Progress: This strategy was eliminated by the MAC, because adoption of this standard would result in increased development cost that could potentially slow or limit growth throughout the Town's Planning Jurisdiction.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 35: Develop a policy to require proper waste disposal and recycling.

Progress: This strategy was eliminated due to the fact that this effort is established as a basic municipal service that is not deemed relevant to the Town's mitigation efforts.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 36: The Town shall work with other appropriate governmental bodies, namely New Hanover County and surrounding communities to provide for a continued pure supply of potable water.

Progress: The City of Wilmington has worked diligently over the last five years to ensure that there is a safe sanitary water supply for the Town. This effort has included collaboration with the Cape Fear Public Utility Authority. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC34

Strategy CB 37: The fire department has the responsibility to assure the Town's protection during fire events. Part of this responsibility is dependent upon the department's ability to maintain the materials and a knowledge base for addressing such an event. This responsibility must be supported by provision of adequate funding for the continuing education and materials necessary to maintain this preparedness.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC14, NHC15, NHC31

Strategy CB 38: Explore and seek access to all potential sources of information and communication regarding early fire detection.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC14, NHC31

Strategy CB 39: Evaluate and improve fire fighting procedures.

Progress: The Town's fire department works to improve fire event preparedness on a day-to-day basis. These efforts involve continued education, training exercises and outreach. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative

efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC31

Strategy CB 40: Ensure the fire hydrants are working properly.

Progress: The Town Public Works department works closely with the Town fire department to inspect all hydrants annually to ensure they are working properly. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC31

Strategy CB 41: The Town should develop a plan of action to maintain the materials and knowledge base for addressing a HAZMAT spill, or develop preliminary measures to assist the county until the representatives arrive.

Progress: The Town has worked closely with the New Hanover County LEPC to address hazards associated with hazardous materials, HAZMAT, and/or dangerous spills. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC35

Strategy CB 42: The Town may consider supporting offshore drilling for gas and oil based on justifiable need and economic conditions. Other policies promoting renewable energy would be preferred. The Town does not support or permit oil refineries, storage facilities, or staging areas in the town.*

Progress: This strategy has been eliminated from the plan, because this was not deemed an appropriate avenue to address this sensitive environmental issue.

Status/Corresponding 2015 Strategy: Eliminated

Strategy CB 43: The Town should develop a plan of action to maintain the materials and knowledge base for addressing a nuclear event, or develop preliminary measures to assist the county until the representatives arrive to maintain nuclear event preparedness.

Progress: The Town's police and fire departments have worked over the last five years with the County Local Emergency Planning Committee to address the issue of nuclear event preparedness. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC35

Town of Kure Beach

Strategy KB 1: Relocate the Riggins condominium complex, consisting of four residential properties, away from identified flood hazard area.

Progress: This project was never completed due to a lack of interest by property owners. The Town will maintain a general policy of carrying out structural mitigation projects moving forward. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy KB 2: Enhance public education and awareness strategies for disaster preparedness and prevention through hosting public meetings/workshops with guest speakers, in addition to providing additional literature on natural hazards and mitigation techniques.

Progress: The Town has not carried out education and awareness programs. Over the last five years, the Town has relied on New Hanover County emergency management for this function. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC4, NHC13, NHC14, NHC17, NHC26

Strategy KB 3: Enhance GIS capabilities for the Kure Beach Public Works Department through the addition of hazards specific spatial data to existing databases.

Progress: The Town has worked in conjunction with New Hanover County over the last five years to expand upon the Town's GIS system and spatial data resources. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC2

Strategy KB 4: Increase wildfire risk awareness and seek recognition through "Firewise Communities USA," in addition to developing strategies to buffer structures located on the urban wildland interface by cooperation with New Hanover County and the federal government.

Progress: The Town has not taken steps to be recognized as a "Firewise Community;" however, the Town does work annually with the NC Department of Forest Services to provide education and outreach to local residents. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with

effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC14, NHC15

Strategy KB 5: Design, build and maintain a managed stormwater system that is compliant with EPA's Stormwater Phase II requirements to minimize increased stormwater flooding due to increased construction.

Progress: This strategy has not been completed due to the exorbitant expense of designing and building a new system; and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy KB 6: Continue to upgrade building codes and safety standards in cooperation with New Hanover County. Continue to upgrade and modify the Kure Beach building code to enhance the ability of structures to withstand storms.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. It should be noted that no locally specific standards were adopted. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This
change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC6

Strategy KB 7: Pursue elevation projects for any identified repetitive loss properties where the homeowner has expressed interest in such a project.

Progress: No elevation projects were funded or treated over the last five years; however, as previously stated, the Town will maintain a pro-active approach towards structural elevation for repetitively damage residential structures. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6- 3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

City of Wilmington

Strategy ILM 1: IT Disaster Recovery / Business Continuity Planning Critically review the City's IT Systems, Infrastructure and Policies and develop a DR/BC Plan. Funds for this have been included in our requested budget and we have made some initial contacts to be included in a pilot program provided by the Institute of Governments Center For Public Technology.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be

eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 2: Pursue overall upgrade to IT system redundancy improvements to the network infrastructure, including: (1) improved switching equipment and related components; (2) a strategically expanded network to provide multiple routing alternatives through looping and expanding our fiber optics system; and (3) the implementation of a dedicated generator back-up.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated Countywide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 3: Implement program and system to transfer financial systems data to a hosted disaster recovery service.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated Countywide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 4: Replacement of all major City radios to the upgraded Motorola digital radio network.

Progress: This strategy has been completed since the last Plan update in 2011; however, the City will continue to maintain and upgrade the system as needed. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC24

Strategy ILM 5: Prepare and maintain a current list of all City employees by job classification with contact information to facilitate calling in resources for emergency response.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated Countywide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ILM 6: Provide special vehicle placards for City employees designated to respond in emergency situations to restricted areas or during periods of curfews.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated Countywide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Eliminated

Strategy ILM 7: Post information on the City's web page and Intranet to assist citizens in preparing for emergency situations.

Progress: This strategy has been completed since the last Plan update in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC28, NHC30, NHC38

Strategy ILM 8: Develop and maintain internal policies and procedures to support City employees in responding to emergency situations. Policies and procedures will include, but will not be limited to an Inclement Weather Policy.

Progress: This strategy has been completed since the last Plan update in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC36

Strategy ILM 9: Training for City personnel through FEMA's Emergency Management Institute (EMI) including ICS 100, ICS 200, ICS 300, ICS 400, ICS 400, IS 700, and IS 800

Progress: This strategy has been completed since the last Plan update in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC37

Strategy ILM 10: As part of the City of Wilmington Operation Center Project, the City of Wilmington is constructing all buildings with backup generators. Two of the buildings will be constructed to earthquake standards to protect the City of Wilmington's Traffic Control Center and the Operations Emergency Operations Center (EOC) for the field operation groups. This purchase of the property was chosen with connection to major thoroughfares so response vehicles could deploy easier during an emergency event. Presently responding divisions are in residential areas with numerous trees.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 11: Complete Walnut Street Wastewater Pump Station Improvements Project, which includes the addition of a fourth pump and a new in-stream waste grinder. Floodproofing and structural upgrades to the existing superstructure, replacement of the existing motor control center, HVAC upgrades, and replacement of pump isolation valves will also be included.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 12: Partner with the County to develop public information campaign utilizing external communications vehicles such as GTV-8 and NHCTV, city and county web sites and TV/Radio public service announcements. Campaign would address ongoing mitigation efforts, as well as ways to prepare for hurricane season.

Progress: This strategy has been completed since the last Plan update in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC17, NHC28, NHC30

Strategy ILM 13: Partner with the County to incorporate hazard mitigation educational materials in existing communication vehicles such as city newsletter, city/county water bills, city/county Web sites, bills and speaking engagements.

Progress: This strategy has been completed since the last Plan update in 2011. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC38

Strategy ILM 14: Seagate Drainage Project - flooding mitigation of major NCDOT thoroughfare and volunteer fire station.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 15: Engineering Feasibility Study for New Center Drive - flooding mitigation of major NCDOT thoroughfare and City pump station.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be

eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 16: Market Northwoods Drainage Project - flooding mitigation of properties along major NCDOT thoroughfare.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 17: Hinton Ave/Michelle Dr Drainage Project - flooding mitigation in residential area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 18: Cedar Ave & Sweetwater Outfall Drainage Project - flooding mitigation of NCDOT major thoroughfare through commercial area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 19: Heidi Drive Drainage Project – flooding mitigation in single family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 20: Market Street/Inland Greens Drainage Project - First phase of project to mitigate flooding mitigation in single family neighborhood and along Cardinal Drive.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 21: Plaza East Drainage Project - flooding mitigation of major drainage outfall through commercial area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 22: Lincoln Outfall Project – Stream bank stabilization project in single-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 23: Doctors Branch bank Stabilization Project. – Stream restoration and bank stabilization project in single-family and multi-family neighborhood.

Progress: The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC5, NHC10

Strategy ILM 24: Longstreet Canal Drainage Project - Flooding mitigation and erosion stabilization of major drainage outfall through residential area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 25: Dupree Dr Drainage Project - flooding mitigation through residential area because of lack of drainage system.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 26: Cavalier Drive Drainage Project – flooding mitigation in single-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 27: Wisteria/Clearbrook Drainage Project – flooding mitigation in single-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be

eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 28: Burnt Mill Tidegate Project – Restoration and rehabilitation of tidegate structure and repair of breached area around tidegate that reduces flooding in Burnt Mill Creek area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 29: Mineral Springs 02-03 Project – flooding mitigation in commercial area.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 30: Benda Drive Drainage Project – flooding mitigation in single-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 31: Cardinal/George Trask Project – flooding mitigation in single-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Strategy ILM 32: Hunters Trail Culvert Replacement Project – flooding mitigation in single-family and multi-family neighborhood.

Progress: This strategy has been completed since the last Plan update in 2011; therefore it will be eliminated from the updated County-wide and City of Wilmington strategy tables.

Status/Corresponding 2015 Strategy: Completed

Town of Wrightsville Beach

Strategy WB 1: Support the New Hanover County Emergency Operations Plan, adopted January 2003.

Progress: The Town of Wrightsville Beach has participated in the annual implementation of the New Hanover County EOP over the last five years, including all annexes such as the Tsunami Ready Plan

currently in place for the County and the provision of E-911 services. This effort has included participation in exercises and collaboration regarding annual updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC27

Strategy WB 2: Support the Tsunami Ready Plan for New Hanover County, adopted 2008.

Progress: The Town of Wrightsville Beach has participated in the annual implementation of the New Hanover County EOP over the last five years, including all annexes such as the Tsunami Ready Plan currently in place for the County and the provision of E-911 services. This effort has included participation in exercises and collaboration regarding annual updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18, NHC27

Strategy WB 3: Maintain a post disaster recovery contract with a qualified service provider, to include the provision of essential services and equipment (i.e., generators).

Progress: Wrightsville Beach has maintained a contract with a Qualified Post-Disaster Debris Contractor over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC3, NHC27

Strategy WB 4: Request funding for an Emergency Operations Center, to be located off the island in an effort to serve the town during extreme weather events.

Progress: This strategy has been deemed impractical and too costly, and will therefore be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy WB 5: Monitor the status of backup generators, communications, and vehicles for all critical public facilities. Test generators, communications equipment, and vehicles on a regular basis, not only for maintenance, but to confirm that the equipment continues to match the needs of critical facility expansion or updated operations.

Progress: The Town carries out routine maintenance on an annual basis through the Town's Public Works department. No new generators were acquired during the implementation period. The actions

defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC3, NHC11

Strategy WB 6: Continue to invest in equipment that will ensure uninterrupted communications, to include continued support of the Town's exiting satellite telephone system.

Progress: No new communications equipment has been purchased by the Town over the last five years; however, the Town has completed construction of the Town's new public safety center which provides improved emergency services to town residents and visitors. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC24

Strategy WB 7: Continue to support the efforts of the New Hanover County Emergency Management Department's role in providing Emergency 911 services to the Town. The Town will maintain its internal emergency response communications system as a backup in the event that it is needed.

Progress: The Town of Wrightsville Beach has participated in the annual implementation of the New Hanover County EOP over the last five years, including all annexes such as the Tsunami Ready Plan currently in place for the County and the provision of E-911 services. This effort has included participation in exercises and collaboration regarding annual updates. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC24

Strategy WB 8: Seek grant funding for the acquisition and installation of a new repeater system for the Police Department communications system.

Progress: This strategy was completed in conjunction with development of the new public safety center, and will therefore be eliminated from this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy WB 9: Support storm hazard mitigation policies provided in the 2006 Wrightsville Beach CAMA Land Use Plan.

Progress: This strategy has been carried out through planning and zoning efforts over the last five years. No updates have been made to the Town's CAMA Land Use Plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in

the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC18, NHC21

Strategy WB 10: Continue to enforce the International Building Code, to include requiring that new structures or structures undergoing significant renovation (renovations or expansion exceeding 50% of fair market value) meet code requirements for coastal areas.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC6

Strategy WB 11: Continue to require the provision of an elevation certificate for all development within a Special Flood Hazard Area (SFHA). All elevation certificates will be submitted on an official FEMA Elevation Certificate form.

Progress: The Town has continued, over the last five years, requiring an elevation certificate for all properties located in the flood hazard area. This action is carried out as a function of the Town's Community Rating System program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC6, NHC13

Strategy WB 12: Monitor repetitive loss areas as indicated on Map 7. When necessary, the Town will assist repetitive loss property owners with securing assistance to address either elevation or acquisition of their floodprone property.

Progress: The Town pro-actively seeks out funding for the elevation of repetitive loss structures. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy WB 13: Continue to support the efforts of the NC Office of Dam Safety (NCODS) in their efforts to inspect and maintain structurally sound levee and dam facilities throughout the State.

Progress: The Town has continued, over the last five years, to support the NC Office of Dam Safety's efforts. This action is carried out as a function of the Town's CRS program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative

efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: Table 6-5 (page 6-40)

Strategy WB 14: Require the Town Public Works Department to routinely monitor and prune trees and branches on public property, and within the right-of-way to minimize potential damage in the event of a wind or ice storm. Additionally, support the efforts of Progress Energy to keep all utility easements free from encroaching trees and limbs.

Progress: This strategy is considered a day-to-day function of the Public Works department. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC33

Strategy WB 15: Continue to maintain all properties acquired through HMGP funding or other sources aimed at addressing natural hazard mitigation as open space in perpetuity.

Progress: The Town has maintained this policy over the last five years and will continue to do so regarding all properties acquired through HMGP programs. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC19

Strategy WB 16: Continue to require fire suppression sprinkler systems within all substantially modified or new commercial development and residential construction exceeding two units (three or more). Encourage installation in single-family and duplex residences.

Progress: This strategy is carried out through enforcement of the NC State Building Code. These standards have been imposed over the last five years and will continue through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC6

Strategy WB 17: Consider increasing the size of water lines and water mains on the south end of the island. This action is desired to address fire flow demands that continue to increase as new residential structure sizes expand in square footage.

Progress: This strategy will not be implemented due to the exorbitant cost associated with this project.

Status/Corresponding 2015 Strategy: Eliminated

Strategy WB 18: Continue to maintain the facilities and support the efforts of the Wilmington Municipal Fire Department to provide maritime fire protection services within Wrightsville Beach.

Progress: The Town has been diligent in carrying out this strategy through development of the Wrightsville Beach Public Safety Center. This facility was completed over the last planning period, and will assist in fire protection moving forward. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC31

Strategy WB 19: Improve Community Rating System (CRS) status.

Progress: The Town's CRS status has not improved over the last five years; however, the Town hopes to improve the rating through recently established guidelines regarding the CRS program. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC25, NHC31, Table 6-5 (page 6-40)

Strategy WB 20: Consider working with regional partners on the development and adoption of legislation that will enable the Town to enforce the wind-borne debris International Building Code standards throughout the Town's corporate limits (enabling the town to secure a CRS rating of 5).

Progress: This strategy has been deemed too difficult to achieve from a political standpoint and will therefore be eliminated from this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy WB 21: Work to maintain the Town's status as a Cooperating Technical Partner under the terms of the NFIP Community Rating System (CRS).

Progress: The Town has maintained this status through participation in the CRS program over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC9, NHC12, NHC13, NHC18

Strategy WB 22: Monitor the Town's water supply to determine if aquifers are threatened or if other alternatives are required.

Progress: The Town has carried out this strategy through local and regional water supply protection measures. Through implementation of the Town' sWater Supply Shortage Plan, these efforts will continue but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC34

Strategy WB 23: Continue to seek funding sources for the elevation or retrofitting of existing sewer lift stations in an effort to reduce or eliminate the impacts from flooding. The lift stations and the need/priority for elevation are outlined on Map 8.

Progress: No sewer infrastructure components have been treated over the last five years; however, the need still exists and the Town will monitor the situation through this update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC7

Strategy WB 24: Update the Town's Flood Damage Prevention Ordinance in conjunction with the development of a Unified Development Ordinance (UDO).

Progress: The Town did not update the FDPO in conjunction with development of the UDO, but did update the Ordinance in conjunction with the FIRM map update process. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC9, NHC18

Strategy WB 25: Request Hazard Mitigation Assistance (HMA) funding for elevation/floodproofing of repetitive loss properties.

Progress: The Town has maintained this policy over the last five years and will continue to do so regarding all properties acquired through HMGP programs. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy WB 26: Request Hazard Mitigation Assistance (HMA) funding for the elevation of structures substantially damaged during a natural hazard event.

Progress: The Town has maintained this policy over the last five years and will continue to do so

regarding all properties acquired through HMGP programs. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy WB 27: Request Hazard Mitigation Assistance (HMA) funding for wind proofing of critical facilities.

Progress: The Town has maintained this policy over the last five years and will continue to do so regarding all properties acquired through HMGP programs. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC12

Strategy WB 28: Continue to provide technical information to builders, developers, & architects in an effort to familiarize them with NFIP land use and building standards and principles for quality redevelopment and safe housing development through written materials or a Town-sponsored workshop.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC25

Strategy WB 29: Advertise the availability of flood insurance once annually through direct mailings, coordination with local real estate agents, and on the Town's website.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC17, NHC25

Strategy WB 30: Distribute a flood protection flyer through a community newsletter, utility bill, or

other document that is distributed to all residences once annually. The flyer will include the following information: flood safety, flood insurance, property protection, floodplain development requirements, and drainage system maintenance. This information will also be made available at the Town's municipal building.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC17, NHC25

Strategy WB 31: Provide information to all individuals inquiring about issues relating to floodplain development. This effort will involve educating citizens about the development constraints and requirements regarding development within a Special Flood Hazard Area (SFHA). This service will be advertised on the Town's website, and once annually in the local newspaper.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC17, NHC25

Strategy WB 32: Ensure that the local New Hanover County Public Library maintains documents about flood insurance, flood protection, floodplain management, and natural and beneficial functions of floodplains. Many documents are free of charge from FEMA. The Town will maintain a disclosure statement from the library that these material are available, and have been incorporated into the library's resource inventory system.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC25

Strategy WB 33: Provide local real estate agents with handouts that will advise potential buyers to investigate the flood hazard for the property they are considering purchasing. Additionally, the town will secure disclosure statements from all real estate agencies participating in this effort stating that it is the organization's policy to inform clients about issues relating to developing and/or purchasing property within the floodplain.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These

services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in

collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC25

Strategy WB 34: Maintain current and accurate information at the municipal building, as well as on the Town's website, regarding the following: mitigation activities, the availability of NFIP flood insurance, emergency operations policies, and evacuation and reentry information.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: NHC13, NHC26, NHC27, NHC28

Strategy WB 35: Continue to maintain accurate and updated Flood Insurance Rate Map (FIRM) information on a Geographic Information System (GIS). This system will be utilized for day-to-day floodplain management activities.

Progress: The Town has maintained flood insurance rate information on the Town's website, as well as through the State of NC website (http://www.ncfloodmaps.com/) over the last five years. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC2, NHC9

Strategy WB 36: Continue to implement the activities outlined within the standing NPDES Permit issued through the North Carolina Department of Environment and Natural Resources. These efforts provide a comprehensive approach to stormwater management planning.

Progress: The Town has continued to carry out activities outlined within the Town's NPDES Stormwater

Permit over the last five years. This effort has included strict enforcement of the Town's Stormwater Management Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC5

Strategy WB 37: Continue to enforce the Town's Stormwater Management Ordinance. This ordinance enforces standards relating to post development runoff conditions, as well as protection of the Town's MS4 against illicit discharges and dumping.

Progress: The Town has continued to carry out activities outlined within the Town's NPDES Stormwater Permit over the last five years. This effort has included strict enforcement of the Town's Stormwater Management Ordinance. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-3). This change is a result of collaborative efforts focused on developing an effective Regional Plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: NHC10

PENDER COUNTY MITIGATION PROGRESS REPORT

The following provides a summary of progress achieved with regard to the strategies adopted through the 2010 Pender County Multi-Jurisdictional Hazard Mitigation Plan.

Pender County

Strategy 1.1: In concert with the American Red Cross (ARC), maintain a continuously updated list of all ARC approved shelters.

Progress: The County has maintained an updated list of all ARC approved shelters over the last five years as a component of the Couny's ongoing Emergency Operations Planning. The County will revisit this issue on annual basis in conjunction with EOP updates.

Status/Corresponding 2015 Strategy: PC1

Strategy 1.2: Continuously maintain, on the County's website, instructional information on ensuring that onsite sheltering is as safe an option as possible.

Progress: This strategy was deemed redundant to other strategies outlined through the update. Due to this fact the strategy is being eliminated from the plan.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 2.1: Maintain continuous contact/working relationship with electric service providers in the County to address the following (1) disaster preparedness techniques (e.g., tree trimming, vegetation planting requirements, pole replacement), (2) Identify critical electrical facilities needing retrofit or upgrade and map with elevation reference marks and, (3) communication with County officials during and immediately after a natural hazard event that results in loss of electrical power. The MAC will meet at least once per year with electric service providers.

Progress: The County, in conjunction with participating municipalities, has maintained a working relationship with electric service providers through annual EOP processes and procedures reviewed on an annual basis. These efforts include holding an annual coordination meeting prior to the start of hurricane season.

Status/Corresponding 2015 Strategy: PC2

Strategy 2.2: Improve capability of secondary power source at all Pender County and Municipal critical facilities (all buildings).

Progress: Pender County has worked closely with the Towns, as well as NCDPS to ensure that alternative power sources are available at all critical facilities.

Status/Corresponding 2015 Strategy: PC3

Strategy 2.3: Retrofit all Pender County and Municipal facilities for lightning protection (existing buildings).

Progress: This strategy has eliminated through the plan update due to a lack of funding and logistical difficulties.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 3.1: Support conservation easements on all floodprone property and impose such easements on all properties acquired with public assistance funds.

Progress: The County, as well as all participating jurisdictions, have maintained this policy over the last five years in an effort to minimize development in the floodplain.

Status/Corresponding 2015 Strategy: PC4

Strategy 3.2: Integrate new greenway and public park improvements into comprehensive planning and capital improvement efforts (including coordination with all local certified CAMA land use plans).

Progress: This strategy has been removed due to a lack of success in carrying this out over the past two planning periods. The County will revisit this through future Comprehensive Planning Processes, but this strategy will not be carried forward through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 3.3: Provide annual review of development restrictions in floodplain areas and maintain initiatives to ensure limited residential and commercial development in the floodplains and protection of critical facilities. Specifically, address soil testing for engineered foundations, minimum lot size, critical facility protection, manufactured home park requirements including anchoring and elevation, and freeboard requirements (new buildings).

Progress: The County, as well as participating municipalities, have reviewed all land development regulations to ensure that to the maximum extent practicable, floodplain development is limited. These efforts included review of the County's Flood Damage Prevention Ordinance as required through NCDPS and FEMA. No changes were made over the last five years.

Status/Corresponding 2015 Strategy: PC5

Strategy 3.4: Maintain all properties acquired through HMGP Funding or other sources aimed at addressing natural hazard mitigation as open space in perpetuity.

Progress: The County maintained all parcels acquired through HMGP funds as open space. When possible, these sites will be utilized in a manner compatible with FEMA reuse standards; however, this effort has not been achieved over the last five years.

Status/Corresponding 2015 Strategy: PC6

Strategy 4.1: Review "firewise" zoning and subdivision standards and recommend their appropriateness for incorporation into existing (or new) zoning, subdivision, or UDO ordinances. (Source: http://www.firewise.org) This will include the establishment of buffers around National Forest Areas and extreme wildfire areas, improved subdivision design, and other identified mitigation actions. All plans to be reviewed by local Fire Department (new buildings).

Progress: This strategy has not been carried out to date, and there is no intention to proceed with this effort.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 5.1: Annually review County and Municipal Zoning, Subdivision, UDO, and Flood Damage Prevention Ordinances for improved control of flooding hazards, including identifying/responding to new flood data.

Progress: This strategy was deemed redundant to strategy eight outlined above and therefore has been eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 5.2: Adopt and annually update a capital improvement plan with an emphasis on mitigation for critical facilities including relocation and retrofitting (existing buildings). (NOTE: Subject to funding availability)

Progress: The County has maintained this strategy through the annual budget deliberation. The recommendations and data outlined in the 2011 HMP were factored into this discussion.

Status/Corresponding 2015 Strategy: PC7

Strategy 5.3: At the staff level, work with the North Carolina Department of Transportation (NCDOT) to identify and develop resolutions for drainage issues created by NCDOT facilities, including inspections of channels, retention basins, and, as needed, pursue debris removal.

Progress: No progress has been made regarding this strategy over the last five years; however, the County will continue to work closely with NCDOT to resolve these issues.

Status/Corresponding 2015 Strategy: PC8

Strategy 5.4: Apply for all available funding from the Hazard Mitigation Grant Program (HMGP) and funds to assist with the mitigation of severe repetitive loss properties to relocate structures out of the floodplain (existing buildings).

Progress: Over the last five years, the County has not received any HMGP funding to treat repetitive loss properties.

Status/Corresponding 2015 Strategy: PC9

Strategy 5.5: Require a finished floor elevation certificate for all development within the special flood hazard area (SFHA) within both incorporated and unincorporated portions of the County. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined special flood hazard area without the submittal of the required elevation certificate (new buildings).

Progress: The County has continued to implement this strategy in concert with the NFIP program over the last five years.

Status/Corresponding 2015 Strategy: PC10

Strategy 5.6: Continue to comply with North Carolina State Coastal stormwater regulations.

Progress: The County has continued to maintain this strategy in concert with NCDEQ over the last five years.

Status/Corresponding 2015 Strategy: PC11

Strategy 5.7: Continuously maintain information concerning the County's flood data maintenance efforts, including GIS/tax parcel data.

Progress: The County has continued to maintain updated tax parcel information in an effort to ensure effective monitoring and analysis throughout flood prone portions of the County.

Status/Corresponding 2015 Strategy: PC12

Strategy 6.1: Maintain a map information service involving the following: (1) Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including providing information on whether a given property is located within a flood hazard area, (2) Provide information regarding the flood insurance purchase requirement on the county's website, (3) Maintain historical and current FIRM's, (4) Locally advertise annually in the local newspaper, (5) Provide information to inquirers about local floodplain management requirements, (6) Include in the county's newsletter (all property owners) and on the county's website a letter on flood insurance, (7) Notify property owners within a floodprone area that they are subject to flooding (all buildings).

Progress: This strategy has continued to be implemented by the County, as well as participating municipalities, in an effort to promote sound development throughout the County's flood hazard area.

Status/Corresponding 2015 Strategy: PC13

Strategy 6.2: Make information regarding hazards and development regulations within the floodplains available through the following: (1) The County Planning Director will ensure that the local library maintains information relating to flooding and flood protection and (2) The County will provide a link on their website to FEMA resources addressing flooding and flood protection (all buildings).

Progress: This strategy has been maintained as a day-to-day function of County service delivery. This fact is reflected in the updated plan.

Status/Corresponding 2015 Strategy: PC14

Strategy 6.3: Provide comprehensive services regarding planning and development activities within the defined SFHA. These services will include (1) Providing site specific flood and flood-related

information on an as needed basis, (2) Building inspections department will maintain a list of contractors with experience in floodproofing and retrofit techniques, (3) Building inspections department will maintain materials providing an overview of how to select a qualified contractor, (4) Make site visits upon request to review occurrences of flooding, drainage, and sewer problems-- if applicable, inspector should provide one-on-one advice to the property owner, (5) Provide advice and assistance regarding CRS Activity 530, (6) Advertise the availability of services annually within the local newspaper, and (7) Maintain a log of all individuals assisted through these services, including site visits (all buildings).

Progress: This strategy has been maintained as a day-to-day function of County service delivery. This is reflected in the updated plan.

Status/Corresponding 2015 Strategy: PC15

Strategy 6.4: Pender County will work with local real estate agencies to ensure that agents are informing clients when property for sale is located within an SFHA. The County will provide these agencies with brochures documenting the concerns relating to development located within flood prone areas. (all buildings)

Progress: Pender County has continued to carry out this strategy as a component of the Community Rating System Program. The County assists County CRS communities with carrying out this activity.

Status/Corresponding 2015 Strategy: PC16

Strategy 6.5: Coordinate with the Pender County School System Hazards Awareness Educational Programs for use by educators within the Pender County School System.

Progress: This strategy has been carried out as a component of the County's Emergency Operations Planning Program over the last five years.

Status/Corresponding 2015 Strategy: PC17

Strategy 6.6: Post educational information on the County's website addressing the hazards associated with wildfires, hail, tsunamis, and storm surge.

Progress: This strategy has been carried out as a component of the County's Emergency Operations Planning Program.

Status/Corresponding 2015 Strategy: PC18

Strategy 7.1: Continue to rely on the Pender County Emergency Operations Plan (EOP) for effective disaster event communication.

Progress: This strategy has been carried out, including annual updates, in conjunction with all participating jurisdictions.

Status/Corresponding 2015 Strategy: PC19

Strategy 7.2: Maintain a registry of special needs individuals which has been coordinated with the Pender County Department of Social Services. This list will include: (1) Persons on life support systems, (2) Persons dependent on electricity for medical equipment, and (3) Persons with severe mental handicap or mental illness. Coordinate with current county system and local plans. Connect with county CTY (Call Back Program).

Progress: Pender County in conjunction with all participating jurisdictions has worked to promote and solicit participants into the Special Medical Needs program on an annual basis.

Status/Corresponding 2015 Strategy: PC20

Strategy 7.3: Pender County, in conjunction with all participating municipal jurisdictions participating in this document, will work on the five year implementation of this plan. At the end of this five year period, the county will undertake efforts to update this plan including the following ten planning steps: (1) Organize to prepare the plan, (2) Involve the public, (3) Coordinate with other agencies, (4) Assess the hazard, (5) Assess the problem, (6) Set goals, (7) Review possible activities, (8) Draft an action plan, (9) Adopt the plan, and (10) Implement, evaluate, and revise.

Progress: Pender County has carried out this strategy as a requirement and component of plan implementation.

Status/Corresponding 2015 Strategy: PC21

Strategy 8.1: Support storm hazard mitigation policies provided in the 2004 Pender County CAMA Land Use Plan, including redevelopment policies.

Progress: Pender County acknowledges the strategies and data in this plan through all Comprehensive Planning updates, and will continue to do so. Due to this fact, this strategy has been eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 8.2: Continue to enforce the International Building Code, to include requiring that new structures or structures undergoing significant renovation (renovations or expansion exceeding 50% of fair market value) meet code requirements for coastal and noncoastal areas (all buildings).

Progress: Pender County, as well as all participating jurisdictions, have continued to enforce the International/NC State Building Code.

Status/Corresponding 2015 Strategy: PC22

Strategy 8.3: Continue to support the NC Office of Dam Safety's efforts to monitor and inspect all dams throughout the state. The county will rely on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable (all buildings).

Progress: Pender County has carried out this strategy as a component of the Community Rating System Program. The County assists County CRS communities with carrying out this activity.

Status/Corresponding 2015 Strategy: PC23

Strategy 8.4: Request Hazard Mitigation Assistance (HMA) funding for the elevation/floodproofing of repetitive loss properties (existing buildings).

Progress: Pender County, in collaboration with participating municipalities, have pro-actively addressed elevation/acquisition efforts for structures deemed to be Repetitive Loss Properties. The County received award in late 2015 of an FY14 FMA project consisting of five acquisitions and six elevations.

Status/Corresponding 2015 Strategy: PC24

Strategy 8.5: Request Hazard Mitigation Assistance (HMA) funding for wind proofing of critical facilities (existing buildings).

Progress: This strategy was not completed over the last five years. The Town will continue to seek funding under implementation of this update.

Status/Corresponding 2015 Strategy: PC25

Strategy 8.6: Consider working with regional partners on the development and adoption of legislation that will enable the County to enforce the wind-borne debris international Building Code standards throughout the County (enabling the County to secure a CRS Rating of 5).

Progress: This strategy has been eliminated from the plan, due to the fact that this strategy is not considered politically feasible.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 9.1: Continue to implement the activities outlined within the standing NPDES Permit issued through the North Carolina Department of Environmental and Natural Resources. These efforts provide a comprehensive approach to stormwater management planning.

Progress: Pender County is not currently an NPDES community, and therefore this strategy has been

removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 9.2: Continue to maintain state approved water supply plans.

Progress: This strategy has been maintained by Pender County, as well as all municipal entities within the County that maintain a locally maintained public water system.

Status/Corresponding 2015 Strategy: PC26

Strategy 9.3: Adopt water shortage response plans and water shortage ordinances.

Progress: A water shortage response plan was adopted by Pender County in 2011. The ordinance continues to be enforced.

Status/Corresponding 2015 Strategy: PC27

Strategy 9.4: Monitor the county's water supplies to determine if aquifers are threatened or if other alternatives are required.

Progress: This strategy has been eliminated due to the fact that this issue falls under the jurisdiction of NCDENR and is handled at the regional level.

Status/Corresponding 2015 Strategy: Eliminated

Strategy 9.5: Continue to seek funding sources for the elevation or retrofitting of existing sewer lift stations in an effort to reduce or eliminate the impacts from flooding.

Progress: Pender County, in collaboration with participating municipalities, have pro-actively addressed elevation/acquisition efforts for structures deemed to be Repetitive Loss Properties over the last five years.

Status/Corresponding 2015 Strategy: PC28

Town of Surf City

Strategy Surf City 1.1.1: Hold a community sponsored hazard mitigation seminar for the community residents, including information on preparedness for all hazards significant to Surf City.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are

also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: PC18

Strategy Surf City 1.1.2: Educate contractors about principles for quality redevelopment and safe housing development through written materials or a community sponsored workshop.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: PC13, PC14, PC15

Strategy Surf City 1.1.3: Provide new home and property buyers with information on quality redevelopment and safe housing development. The information is probably most efficiently dispersed at the community administration buildings.

Progress: The Town's Planning and Inspections Department maintains a well-trained staff which provides comprehensive services to property owners regarding building and development. These services include guidance regarding development in the defined flood hazard areas. The departments also maintain a library of materials available for review by citizens and builders. These materials are also made available through local library branches and provided to local real estate agents in an effort to provide comprehensive education and outreach regarding development in hazard prone areas. The County, in collaboration with participating municipal jurisdictions, will continue to maintain and provide this information through respective local planning and inspections offices throughout the County.

Status/Corresponding 2015 Strategy: PC14, PC15

Strategy Surf City 1.2.1: Manually disperse and have a website posting which provides information about the Community-Based Hazard Mitigation Plan for Surf City and relevant mitigation measures the public can take. In addition, provide a response/reply section where residents can comment on the effectiveness of the current plan and where they can make suggestions for future revisions oon the plan.

Progress: The Town has maintained this information on the Town website over the last five years and

will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC14, PC18

Strategy Surf City 1.2.2: Manually disperse and have a website posting which provides information about the Multi-Hazard Recovery Plan for Surf City.

Progress: The Town has maintained this information on the Town website over the last five years and will continue to update the website. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC14, PC18

Strategy Surf City 2.1.1: Purchase a complete GIS/plotter setup and provide training on said set up to all pertinent Town personnel.

Progress: This strategy has been completed and therefore, will be removed through the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 2.1.2: Purchase a GPS system for the Public Works Department, Police Department, and Community Development Department.

Progress: This strategy has been completed and therefore, will be removed through the plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 2.1.3: Secure the services of two interns to assist in plotting latitude and longitude of all community structures to develop a data base of structures that could potentially be damaged by a disaster. This will ensure data is immediately available and accurate in order to apply to FEMA funding in the future.

Progress: This strategy has not been completed and will be eliminated since current full-time staff handles this function.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 2.1.4: Purchase a Command Mobile Unit (CMU) for use by the Police Department and Fire Department during and following a disaster.

Progress: This strategy was completed in 2011, and therefore, will be eliminated.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Surf City 2.1.5: Purchase a loader for the Public Works Department in an effort to remove sand from the roads (thereby reopening them) and to replace sand back on the beach (lessening the potential for additional berm damage) in a more timely fashion after a severe disaster.

Progress: This strategy was completed in 2012, and therefore, will be eliminated.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Surf City 2.1.6: Purchase a hand held radio for the Public Works Department in an effort to continue communications between primary town personnel during and following a disaster.

Progress: This strategy was completed in 2012, and therefore, will be eliminated.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Surf City 2.1.7: Purchase backup generators for 3 sub-stations (15kw) in an effort to mitigate the potential for overflow during a flooding event and to ensure continued service following a disaster.

Progress: This strategy was completed in 2013, and therefore, will be eliminated.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Surf City 2.1.8: Purchase a generator for the Police Department (50kw) to ensure communications equipment remains in operation during and following a disaster.

Progress: This strategy was completed in 2013, and therefore, will be eliminated.

Status/Corresponding 2015 Strategy: Completed/Eliminated

Strategy Surf City 2.1.9: Install System Control and Data Acquisition (SCADA) System to assist in keeping the water and sewer systems in working order before, during, and following a disaster.

Progress: This strategy has not been accomplished and will be eliminated because of lack of funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 3.1.1: Replace the Police Department.

Progress: This strategy has not been accomplished and will be eliminated because of lack of funding.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 3.1.2: Elevate Town Hall.

Progress: This strategy has not been completed to date, but the Town will aim to accomplish this effort through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC9, PC24

Strategy Surf City 3.2.1: Participate in the CRS program and develop a CRS plan to assist in mitigating repetitive losses in Surf City.

Progress: The Town has not joined the CRS program to date. The Town will consider joining through this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: Table 6-5 (page 6-40)

Strategy Surf City 3.2.2: Develop a stand-by application for submission to the Hazard Mitigation Grant Program for elevation of structures in the identified areas of repetitive damage.

Progress: This strategy has not been completed; however, NCDPS now handles this function.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 3.2.3: Develop a stand-by application for submission to the Hazard Mitigation Grant Program for acquisition of structures in the identified areas of repetitive damage.

Progress: This strategy has not been completed; however, NCDPS now handles this function.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 3.3.1: Implement the recommendations set forth in the Stormwater Management

Study and any subsequent amendments that will reduce the potential for damage as a result of improper stormwater drainage.

Progress: Portions of this strategy have been implemented; however, the County continues to carry out implementation. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC7

Strategy Surf City 3.3.2: Continue to seek alternate funding sources to implement the recommendations set forth in the Stormwater Management Study from 2000 and any subsequent amendments.

Progress: Portions of this strategy have been implemented; however, the County continues to carry out implementation. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC7, PC11

Strategy Surf City 4.1.1: Update and revise the Zoning Ordinance and its subsequent maps.

Progress: The Town has not updated local zoning regulations; however, the Town will aim to budget funding for this effort through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC5

Strategy Surf City 4.1.2: Update and revise the local Subdivision Ordinance.

Progress: The Town has not updated local zoning regulations; however, the Town will aim to budget funding for this effort through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC5

Strategy Surf City 4.1.3: Update and revise the CAMA Land Use Plan.

Progress: The Town has not updated local zoning regulations; however, the Town will aim to budget funding for this effort through implementation of this plan update. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC5

Strategy Surf City 4.2.1: Develop a Multi-Hazard Disaster Recovery Plan to replace the existing Hurricane Plan.

Progress: This strategy has not been accomplished; however, this Regional HMP should serve to address this issue.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 5.1.1: Continue to enforce the North Carolina State Building Code. Require that new structures or structures undergoing significant renovation meet code requirements for coastal areas in accordance with the International Building Codes.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC22

Strategy Surf City 5.1.2: Reduce the potential for wind borne missals by taking a pro-active approach to investigating and condemning structures that are substantially damaged and unsuitable for habitation.

Progress: The County, as well as all participating jurisdictions, actively enforce the building code and adopt amendments and changes as required. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC22

Strategy Surf City 6.1.1: Develop local Water Shortage Response Guidelines (in different phases) as

a part of the Surf City Multi-Hazard Disaster Recovery Plan as it relates to the expectations of the Town's water supplier.

Progress: This effort was completed in 2012 and will be implemented through future updates of this plan. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is
a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC27

Strategy Surf City 7.1.1: Maintain hazardous materials event preparedness. The Town should develop a plan of action to maintain the materials and knowledge base for addressing such a spill, or develop preliminary measures to assist the county until the representatives arrive. This responsibility must be supported by provision of adequate funding for materials and trainings necessary to maintain this preparedness.

Progress: The Town has not completed this effort; however, Town emergency management has worked closely with the County LEPC to address this issue. The actions defined under this locally specific strategy statement will continue, but are now addressed through updated language presented in the County-wide Mitigation Strategies (Table 6-4). This change is a result of collaborative efforts focused on developing an effective Regional plan with effective intergovernmental coordination and cooperation.

Status/Corresponding 2015 Strategy: PC19

Strategy Surf City 7.2.1: The Town must inspect all propane tanks located within the town limits of Surf City to ensure they are secured as established through state regulations. Town officials have identified their concern is primarily related to tanks floating through town during high water events. However, this strategy will also prevent said tanks from being blown over due to high wind events.

Progress: It has been determined that staff does not have the resources to carry out this strategy. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 7.2.2: The Town should annually inspect all propane tanks located within the town limits of Surf City to ensure there are adequate valve systems.

Progress: It has been determined that staff does not have the resources to carry out this strategy. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 7.2.3: Secure interns to identify via GPS properties with privately-owned propane tanks.

Progress: It has been determined that staff does not have the resources to carry out this strategy. This strategy was deemed not relevant to mitigation activities and therefore, will be removed through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

Strategy Surf City 8.1.1: Increase the number of paid staff positions by adding one additional position.

Progress: This strategy has been deemed irrelevant to the Town's mitigation program and will be eliminated through this plan update.

Status/Corresponding 2015 Strategy: Eliminated

City of Jacksonville

Action #	Description	Hazard	Funding	Responsible Agency/Department	Target Completion Date	Priority	Benchmarks / Indicators of Progress
PREVENTION							
P3	City staff will review current water conservation plan and compare to comprehensive water shortage response plan.	Drought	Local	Public Services	Short Term	Medium	COMPLETED - The City has an adopted water conservation plan and 12 wells were added to the Castle Hayne aquifer; completion of the Nano-Filtration Water Treatment Plant expandable to 8 mgd.
P5	City will evaluate the current building and development forms for evidence that they identify and address mitigation strategies.	All Hazards	Local	Development Services Code Inspections	Annual	Medium	Completed - The Development Services Department has implemented a procedure that identifies threats or concerns with floodplain and/or CAMA regulations during the permitting process. The building and development forms have added required check-offs for reviews to ensure there are no conflicts with floodplain and CAMA regulations.
P8	Jacksonville will consider implementing a wellhead protection program	Flooding (Terrorism)	Local	Public Services Director	Short Term	Low	Completed – received study completed by consultant. New wells have appropriate designs; existing wellheads will be evaluated as upgrades are done
NATURAL RESOURCE ACTION							
*NR1	The City revised the Flood Prevention Ordinance during September, 2005 to ban and/or remove existing companies with hazardous material/junkyards out of the floodplains.	Flooding	Local	Development Services and Code Enforcement	Long-Term	Low	COMPLETED - Modification of floodplain zones resulted in one salvage yard being removed from the floodplain.

Action #	Description	Hazard	Funding	Responsible Agency/Department	Target Completion Date	Priority	Benchmarks / Indicators of Progress
							- Other hazardous material/salvage yard occupancies that have been identified within floodplain zones have been documented as such and inspected as needed. - The Flood Prevention Ordinance established in September 2005 disallows any development of such occupancies in the designated floodplains and prevents re-entry in the event of catastrophic damage.
EMERGENCY SERVICES							
ES2	Fire & Emergency Services Department is utilizing a records management system to accommodate the National Fire Information Reporting System Continuation of existing program.	Wildfire	Local	Fire & Emergency Services	Annual	Medium	COMPLETED - Monthly reports submitted to the Onslow County Fire Marshal and the NC Office of State Fire Marshal.
*ES3	Maintain listing of streets that would be advised to evacuate in the event of a hurricane. When required, the Police and Fire Departments will provide evacuation assistance to those residents who are unable to leave on their own. This applies to residents of flood hazard areas along the New River and its related tributaries as well as to any residents requesting assistance. This program applies at all times and to all natural and man-made threats.	Hurricane All Hazards	Local	Public Services, Public Safety, GIS	Annual	High	Completed A listing of at-risk streets has been compiled and will be maintained through periodic review.

Action #	Description	Hazard	Funding	Responsible Agency/Department	Target Completion Date	Priority	Benchmarks / Indicators of Progress
*ES5	The City will address roads on private property incapable of accommodating emergency vehicles through a public awareness campaign.	All Hazards	Local	Public Safety, Development Services and Code Enforcement, GIS	Short-Term	Medium	COMPLETED City GIS data does private roads in the City. These have been physically identified and evaluated for accessibility issues. This has been accomplished by the Fire Department. - Private driveways are reviewed during the permitting process for new developments by Public Safety, Code Enforcement, and Development Services.
STRUCTURAL							
S2	Improve site monitoring at wastewater pump stations.	Flooding Hurricanes	Local Grants	Public Services	Short Term	Medium	COMPLETED The City replaced all SCADA equipment to improve communication at all wastewater pump stations in order to better monitor and analyze the impact of rainfall and flooding to the sewer system

City of North Topsail Beach

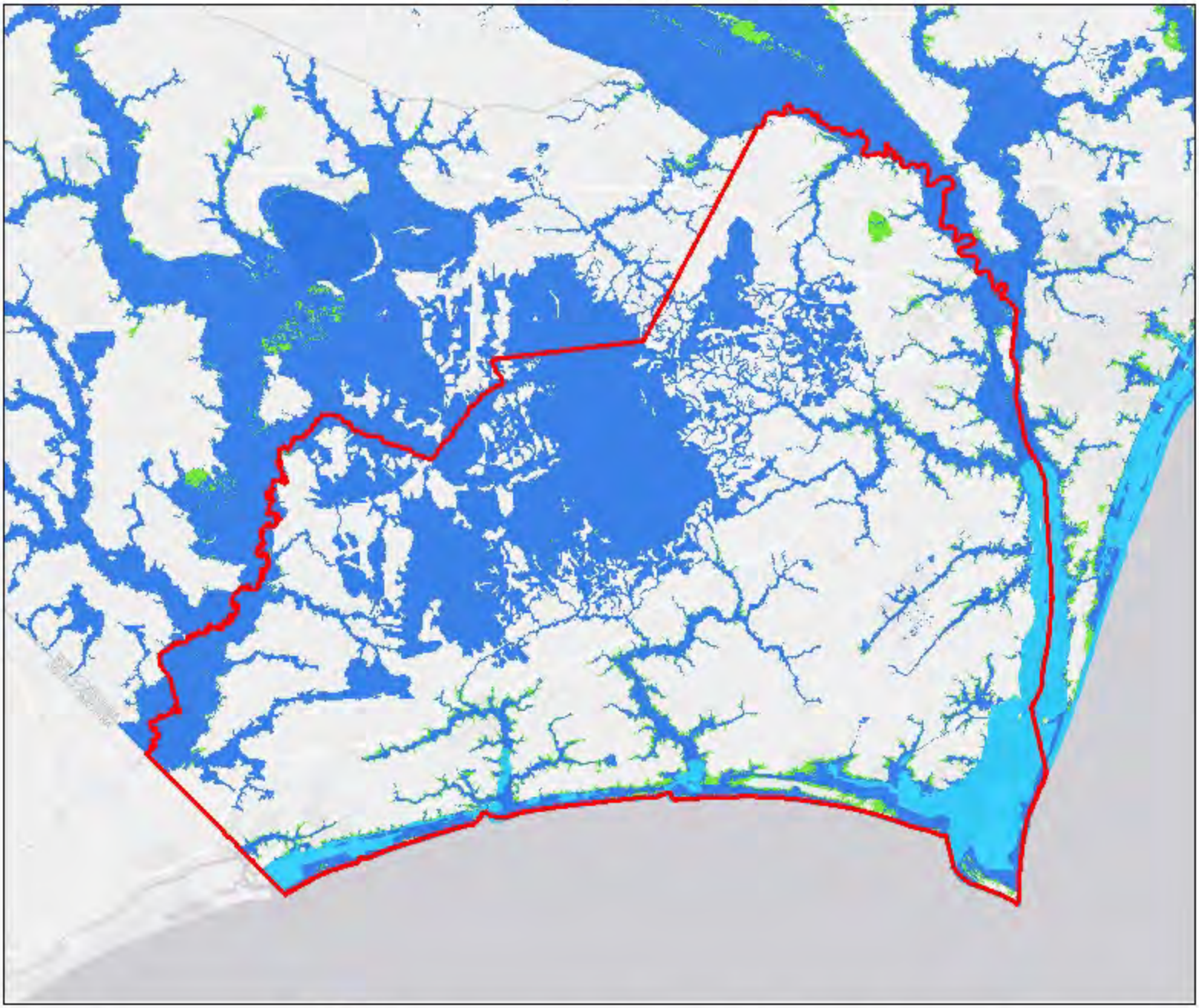
Action #	Action	Hazard	Funding	Responsible Party	Target Completion Date	Priority	Benchmarks / Indicators of Progress
PREVENTION							
P5	NTB will enforce storm water regulations established by the State and incorporate regulations in Zoning Ordinance.	Flooding	Local	Planning	Annual	High	Completed. Regulations were incorporated into the Unified Development Ordinance. - Will ensure enforcement through the permit review process
PP3	The Town has revised its Flood Damage Prevention Ordinance to require 2-foot freeboard and VE Flood Zone construction requirements.	Flooding	Local	Planning	Annual	Medium	COMPLETED: FDPO was updated in 2010. Will ensure enforcement through the permit review and inspections process.

City of Swansboro

Action #	Action	Hazard	Funding	Responsible Party	Target Completion Date	Priority	Benchmarks / Indicators of Progress
PREVENTION							
P4	Request courtesy review by the State NFIP Coordinators Office to identify areas where Swansboro could acquire CRS credit points.	Flooding	Local	Planning Director	Long Term	Low	REMOVE: 2011 CAV visit performed. Action Completed. Determine if Town Board is willing to commit additional time, personnel, and funds to a program that affects relatively few residents.
P6	Swansboro is under the Phase I storm water regulations and has developed a storm water plan.	Flooding	Local	Planner Consultant	Short Term	Medium	REMOVE: Storm Water Plan was completed and adopted. Now reviewed on an annual basis. Removing as compliance not an action.
P9	Town will evaluate the current building and development forms for evidence that they identify and address mitigation strategies.	All Hazards	Local	Planner, Town Clerk, Inspector	Annual	Medium	REMOVE: Annual review is a compliance issue and not an action.
EMERGENCY SERVICES							
ES6	Fire Department is working on a computer system to accommodate the National Fire Information Reporting System	Wildfire	Local	Fire Chief	Short-Term	Medium	REMOVE: Project completed. Action will move into compliance monitoring

Appendix F
Flood Hazard Maps

Brunswick County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

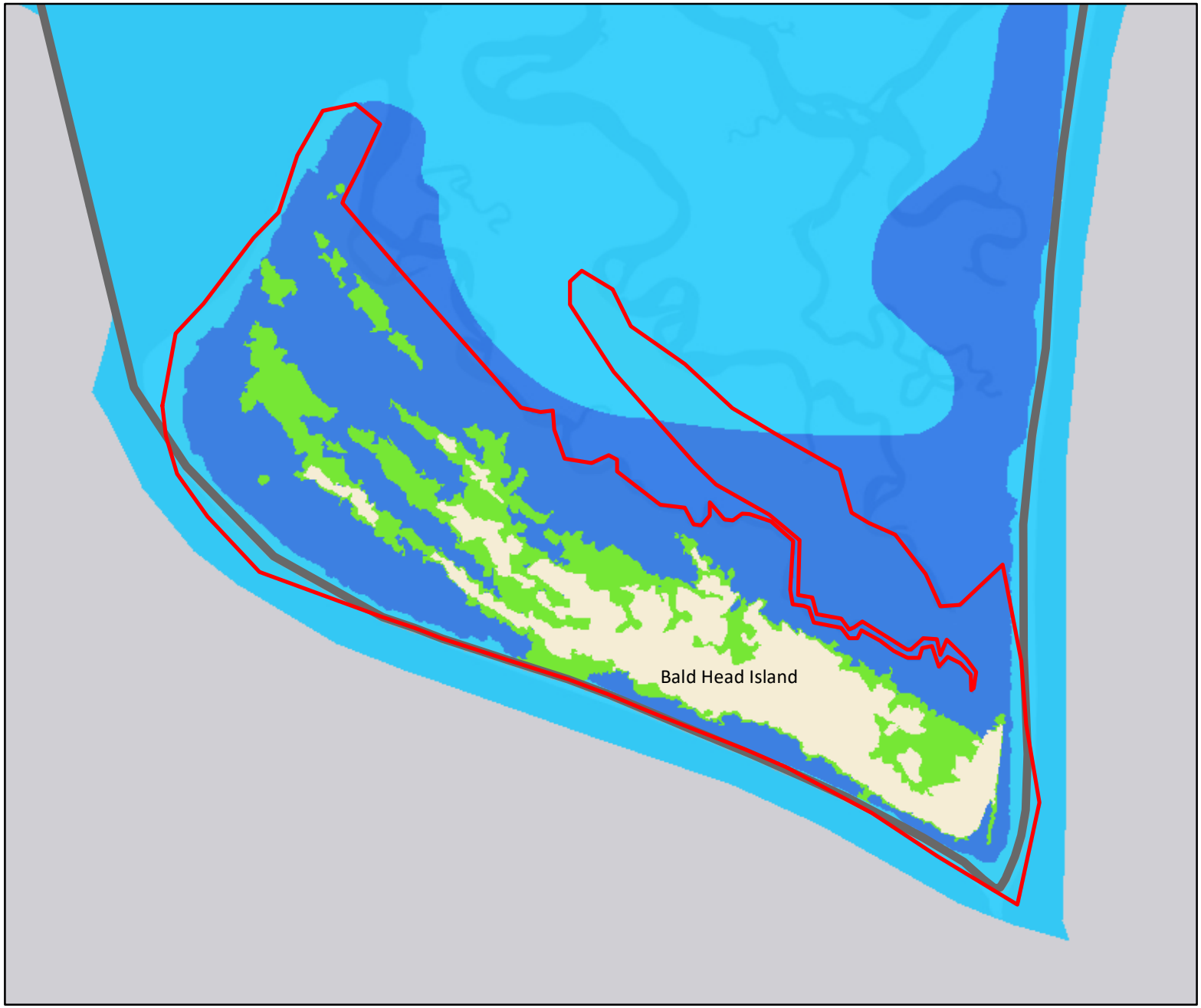
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 4 8 16 Miles

N

Bald Head Island - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

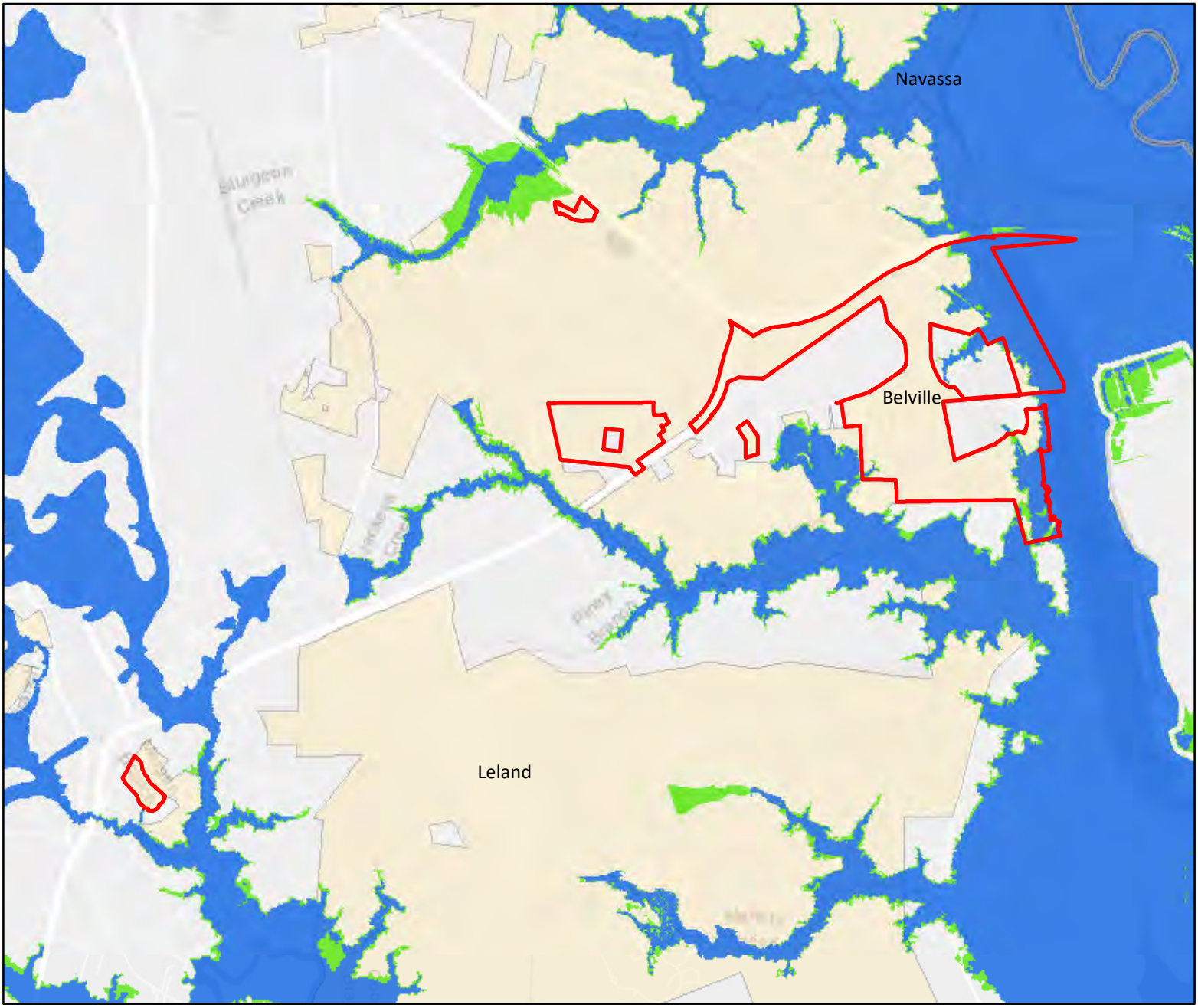
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.275 0.55 1.1 Miles

N

Belville - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

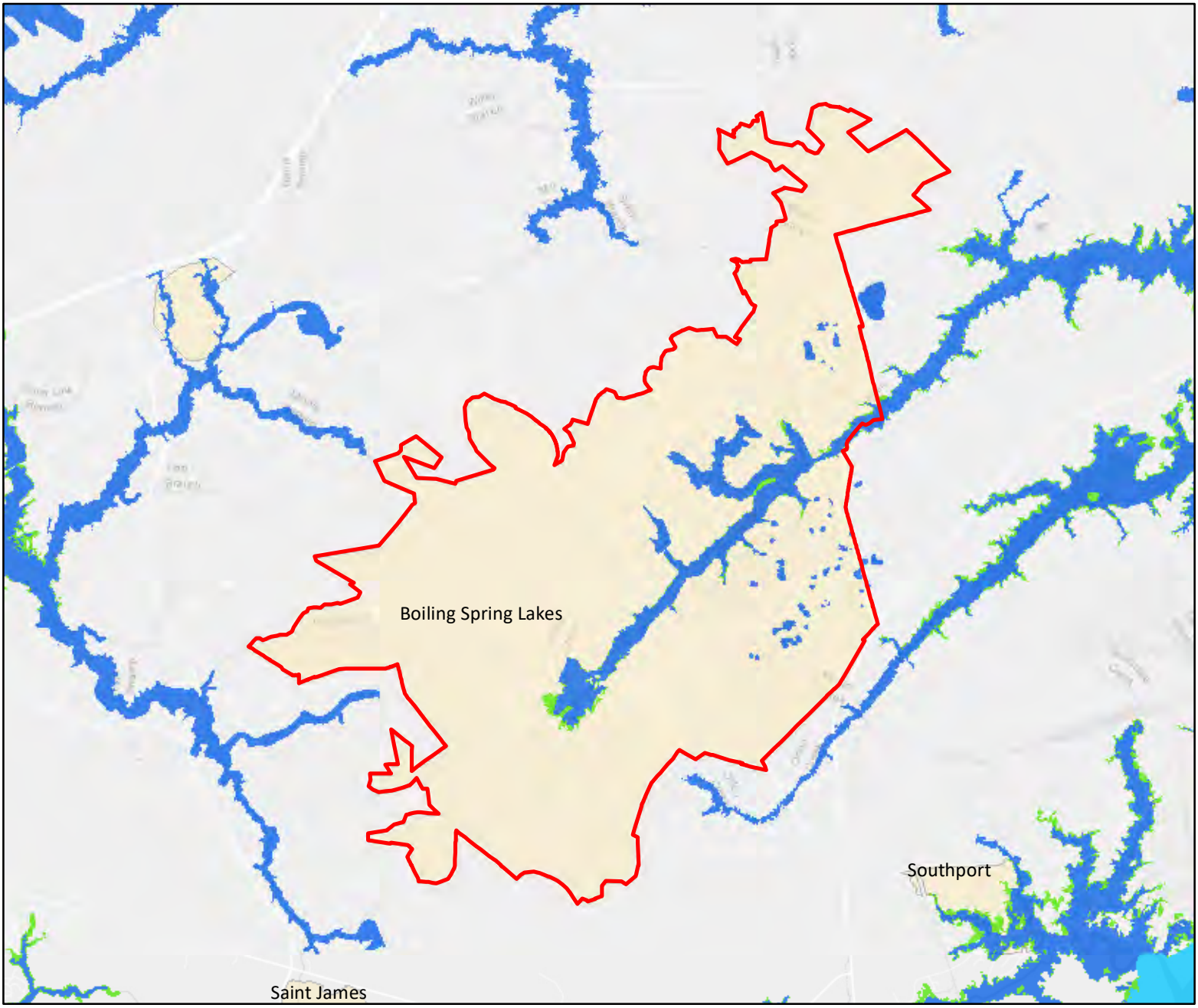
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Boiling Spring Lakes - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

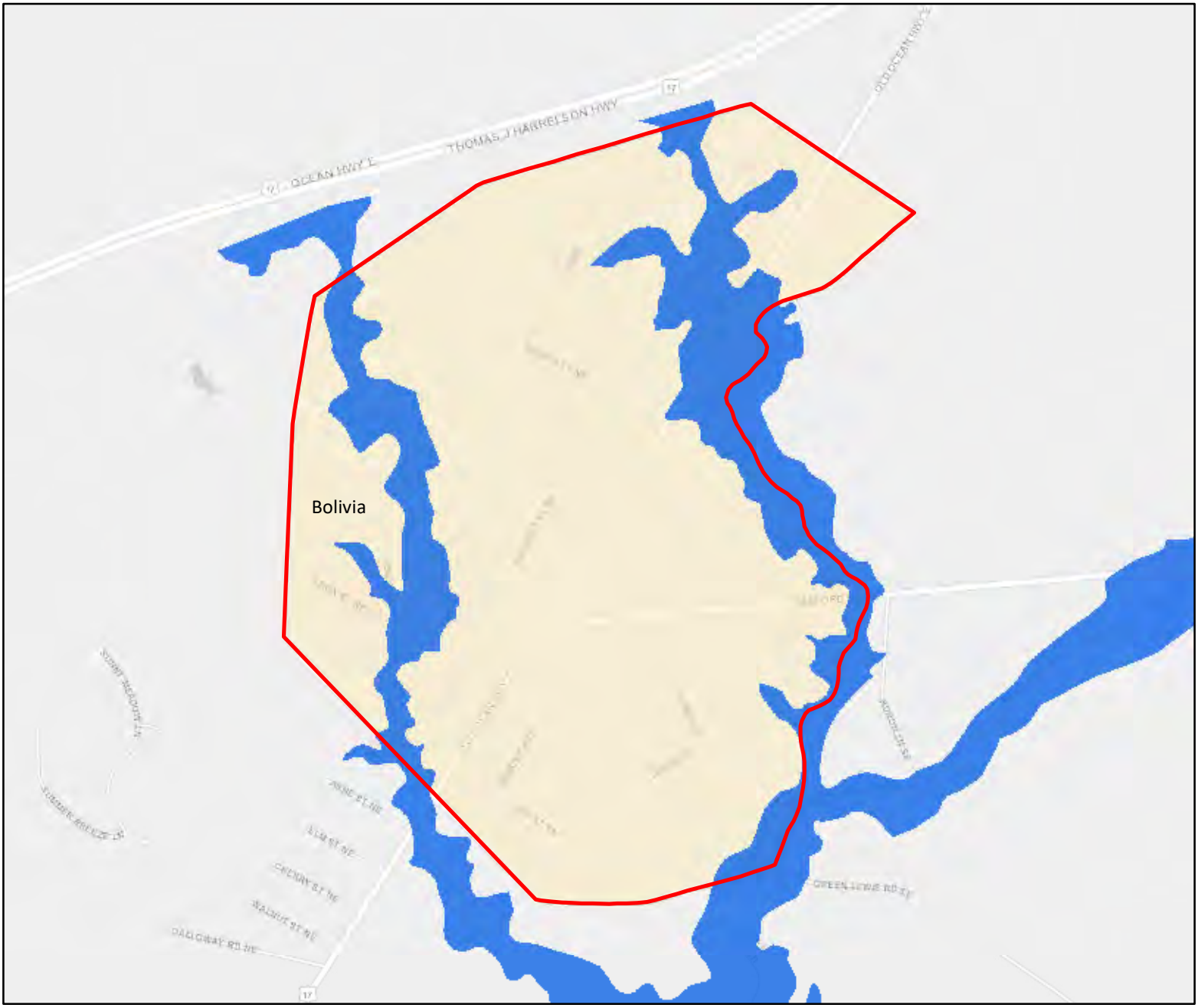
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.75 1.5 3 Miles

N

Bolivia - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

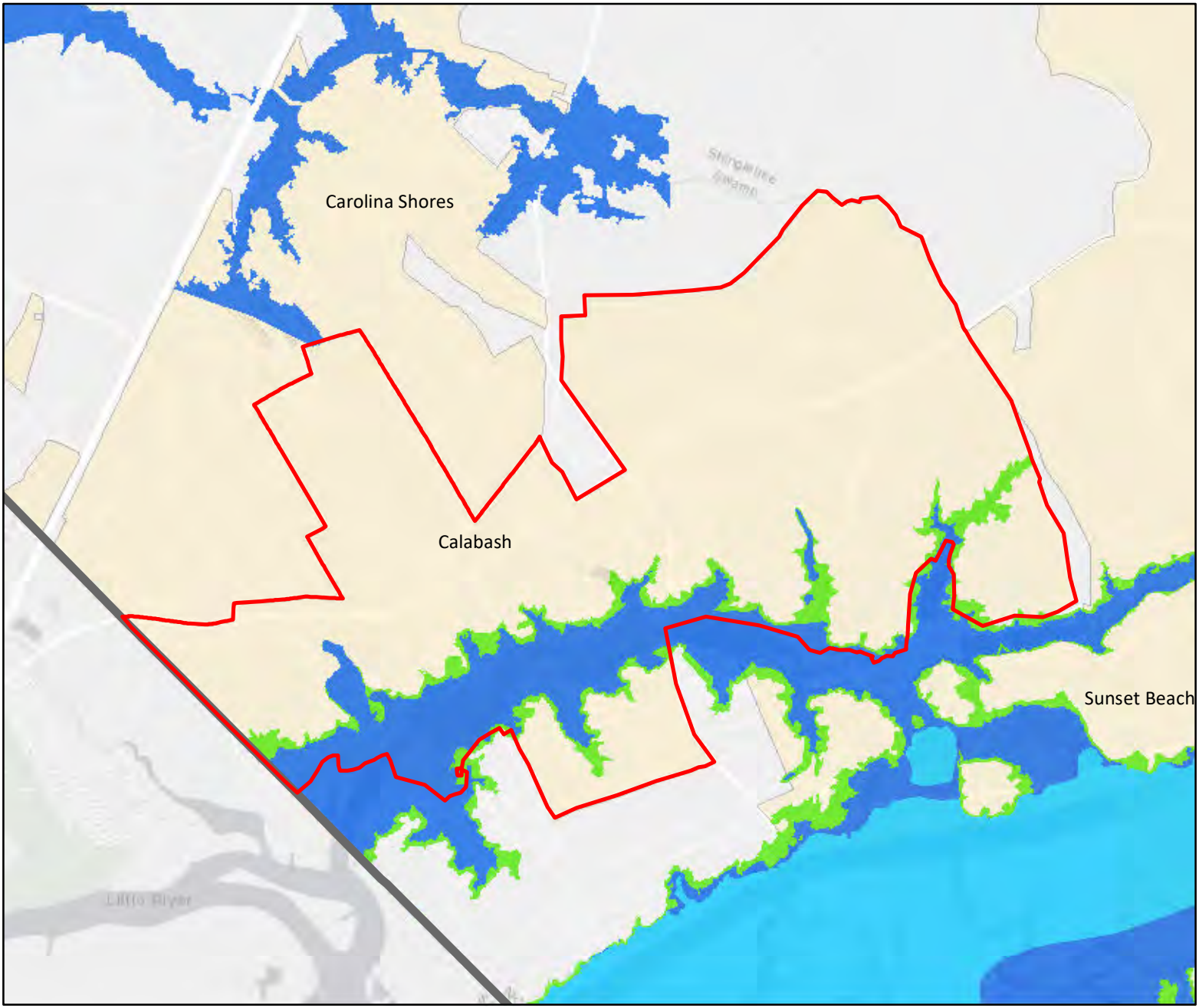
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.1 0.2 0.4 Miles

N

Calabash - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

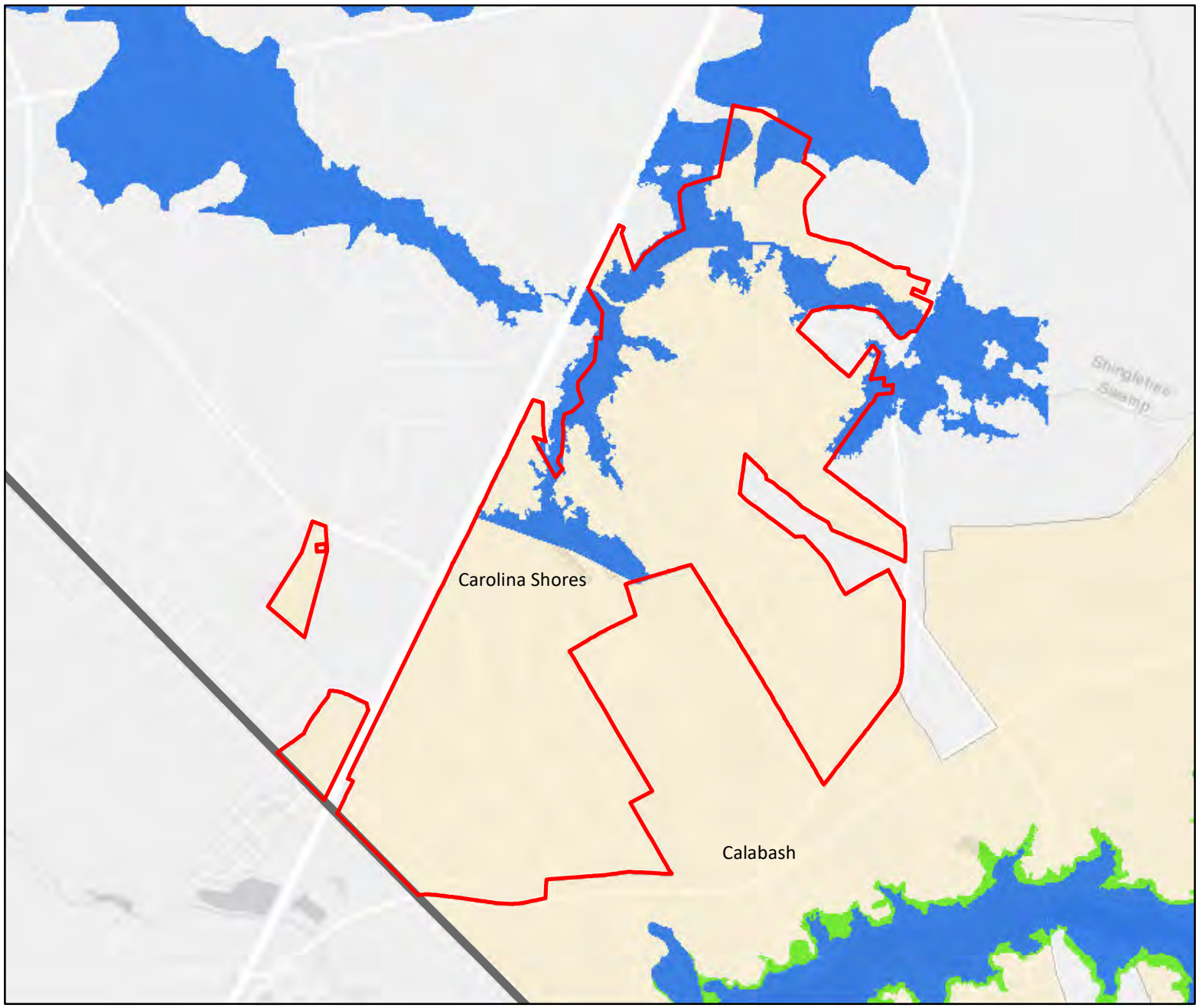
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.35 0.7 1.4 Miles

N

Carolina Shores - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

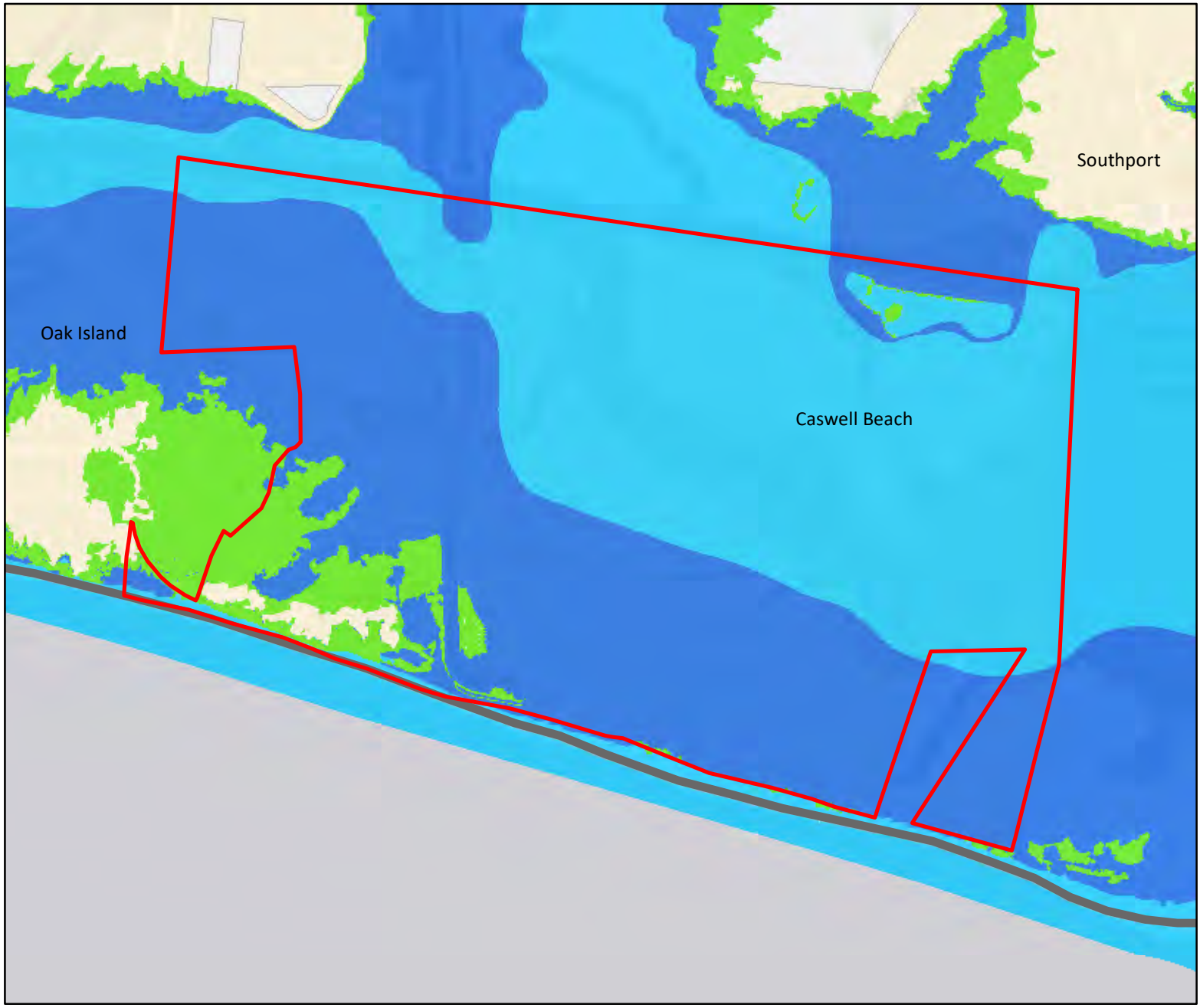
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.3 0.6 1.2 Miles

N

Caswell Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

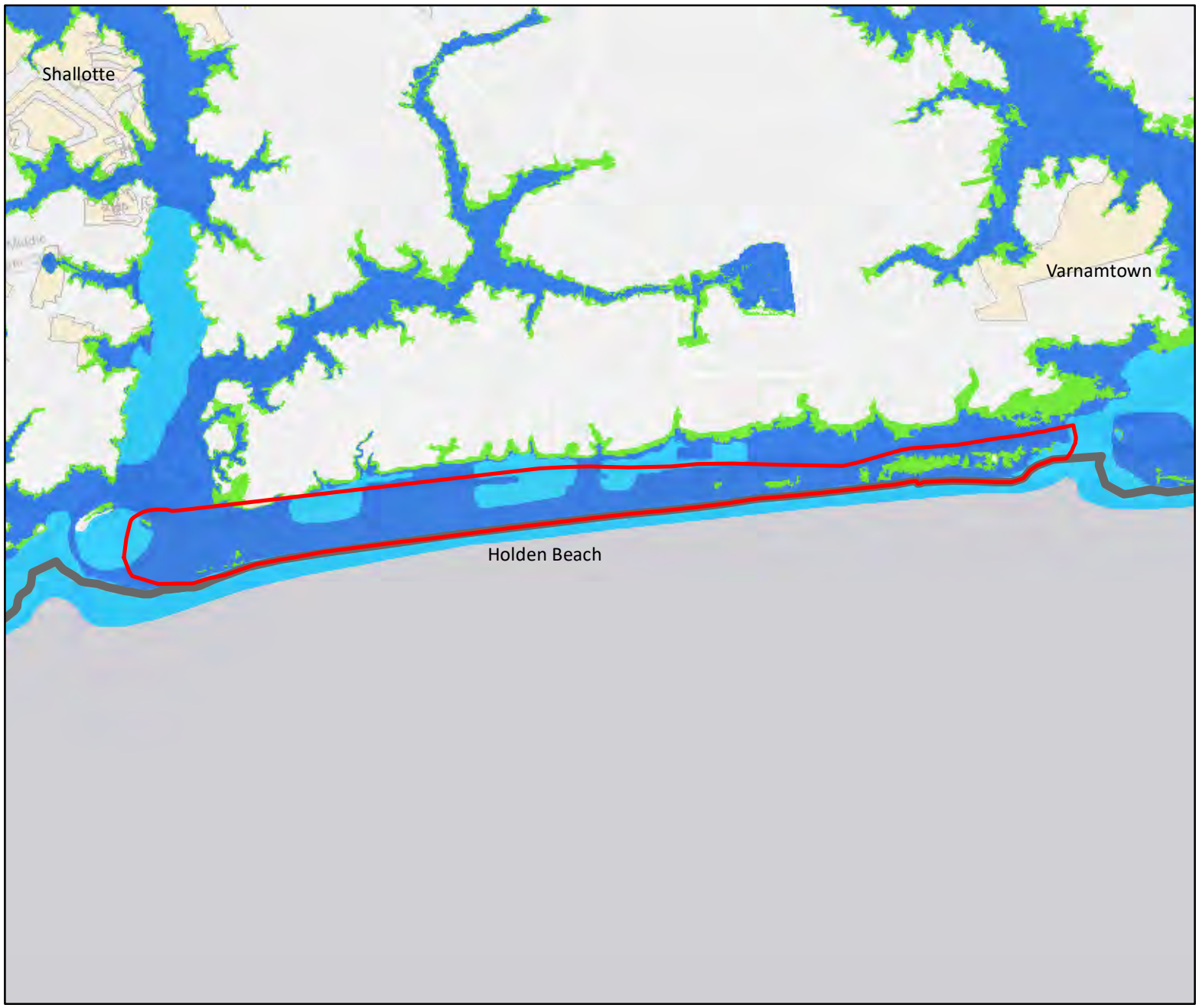
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.275 0.55 1.1 Miles

N

Holden Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Leland - Flood Hazard Areas

Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

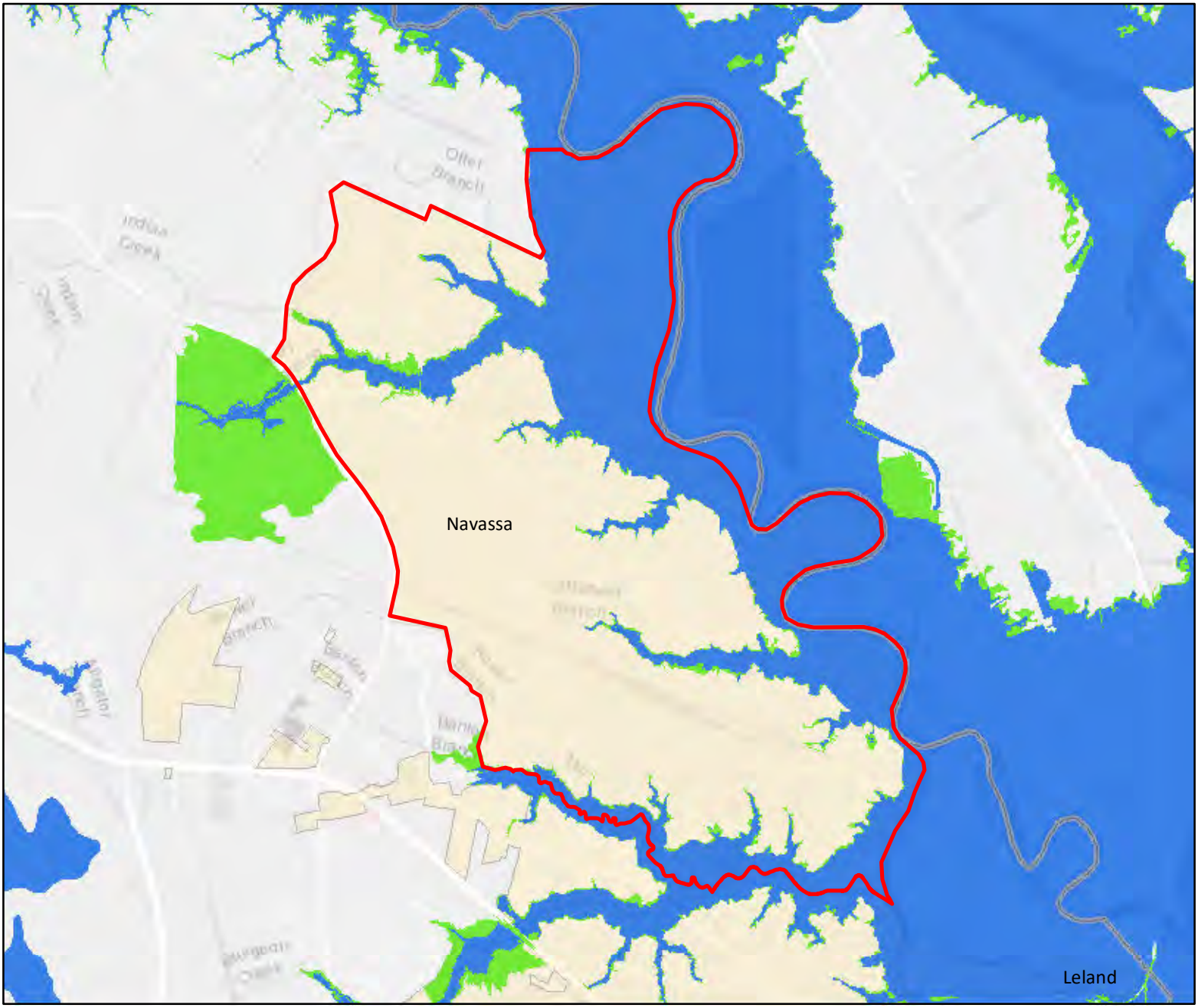
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.75 1.5 3 Miles

N

Navassa - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

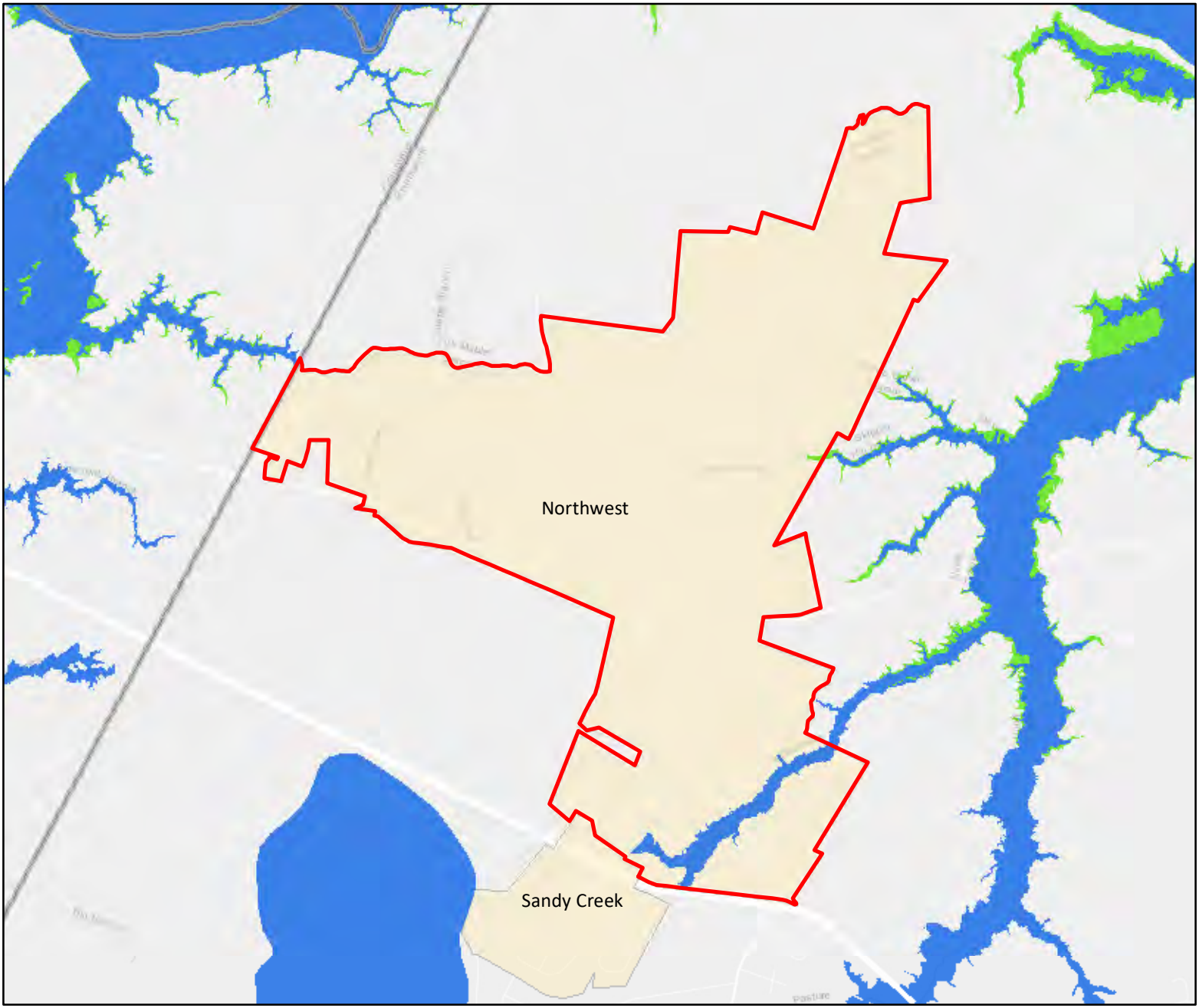
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Northwest - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

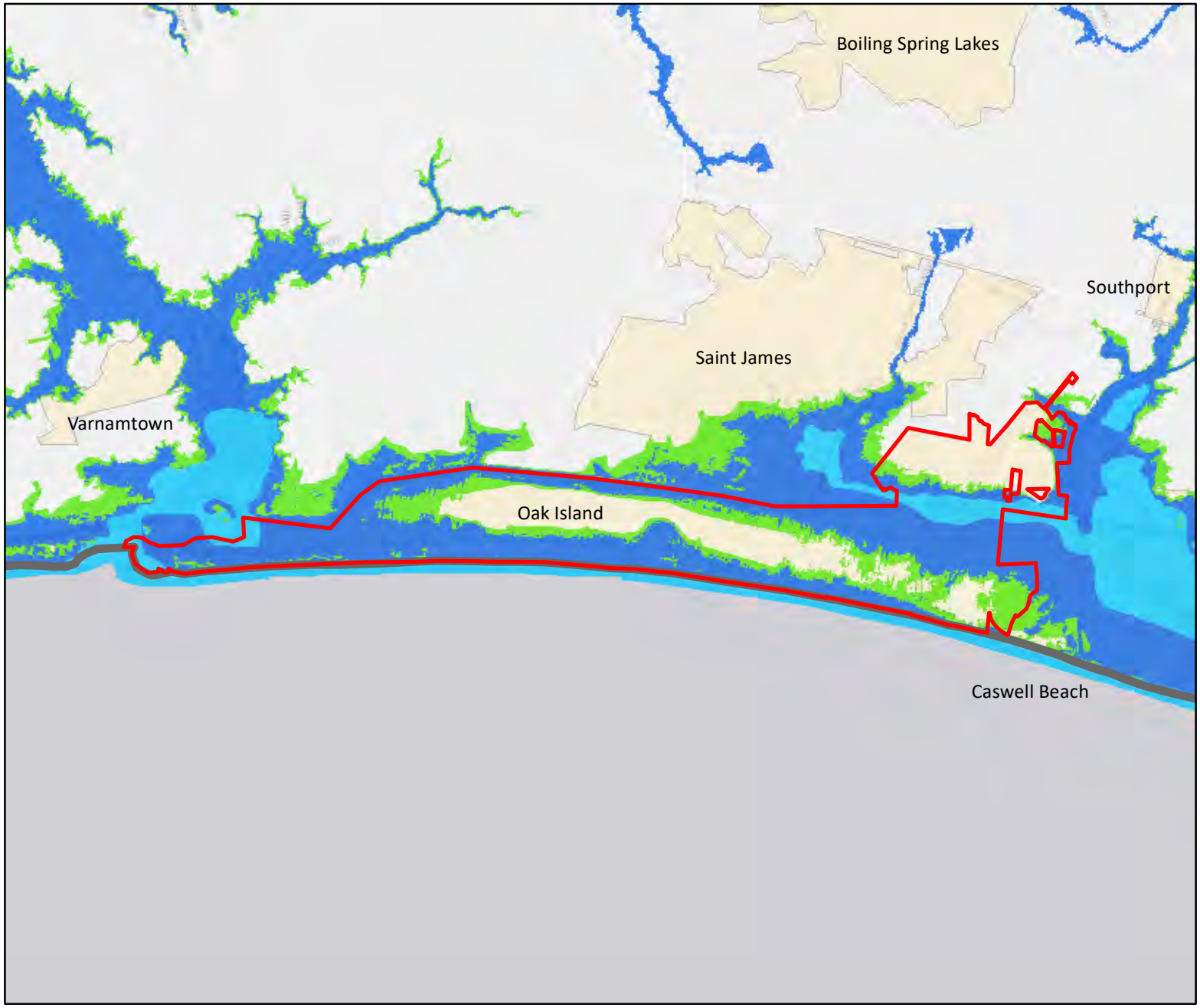
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.45 0.9 1.8 Miles

N

Oak Island - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

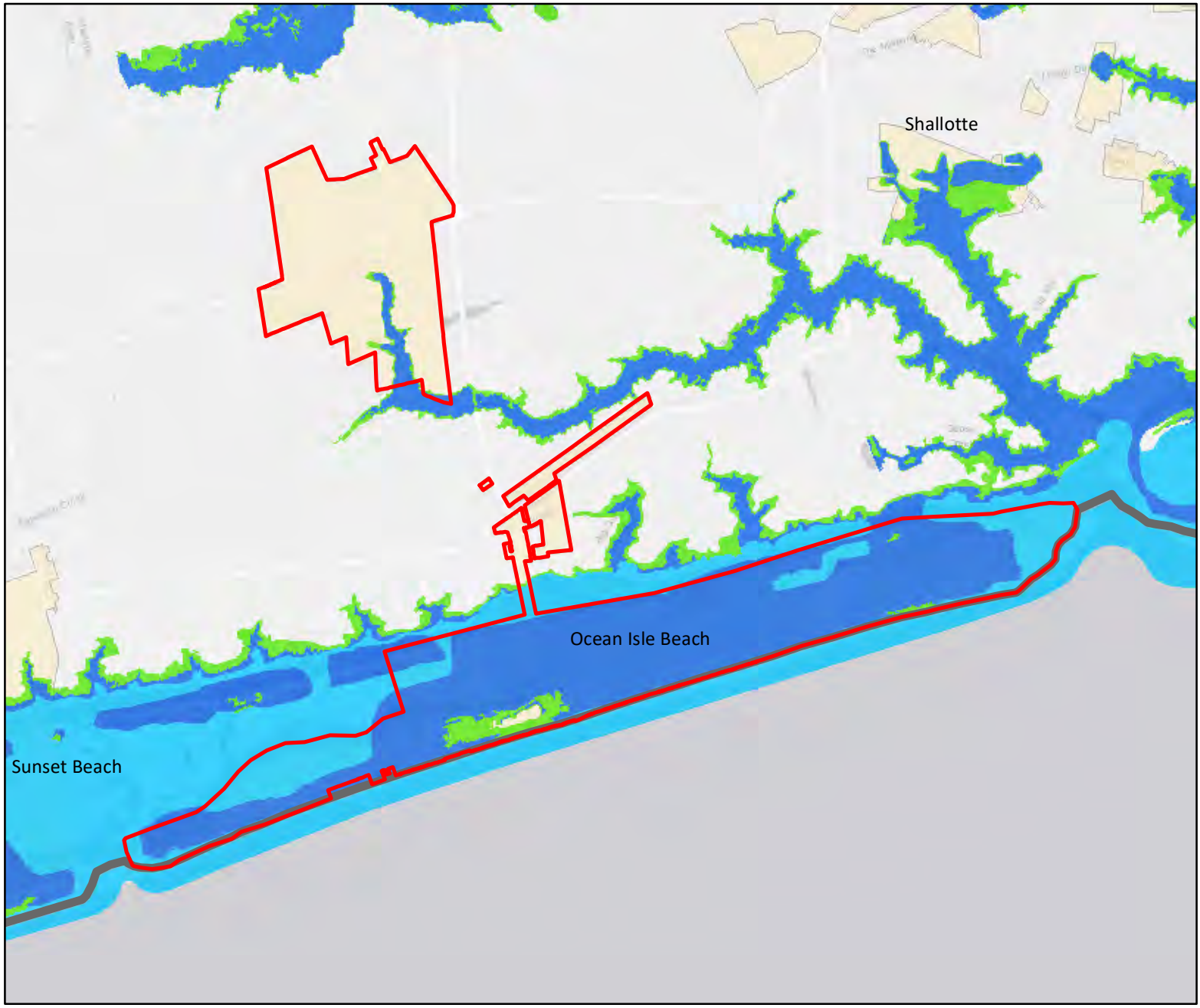
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.75 1.5 3 Miles

N

Ocean Isle Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Sandy Creek - Flood Hazard Areas

Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

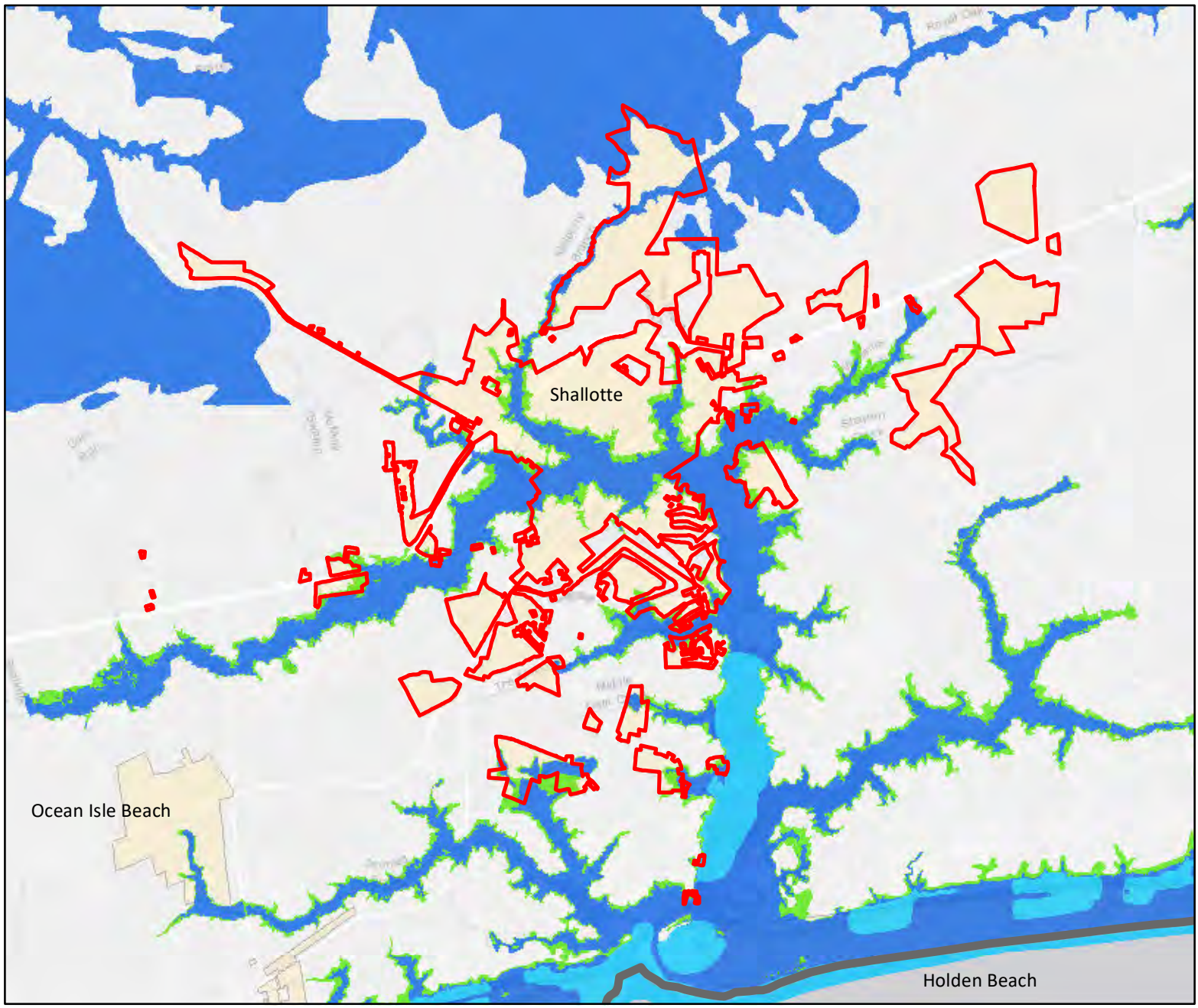
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.1 0.2 0.4 Miles

N

Shallotte - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

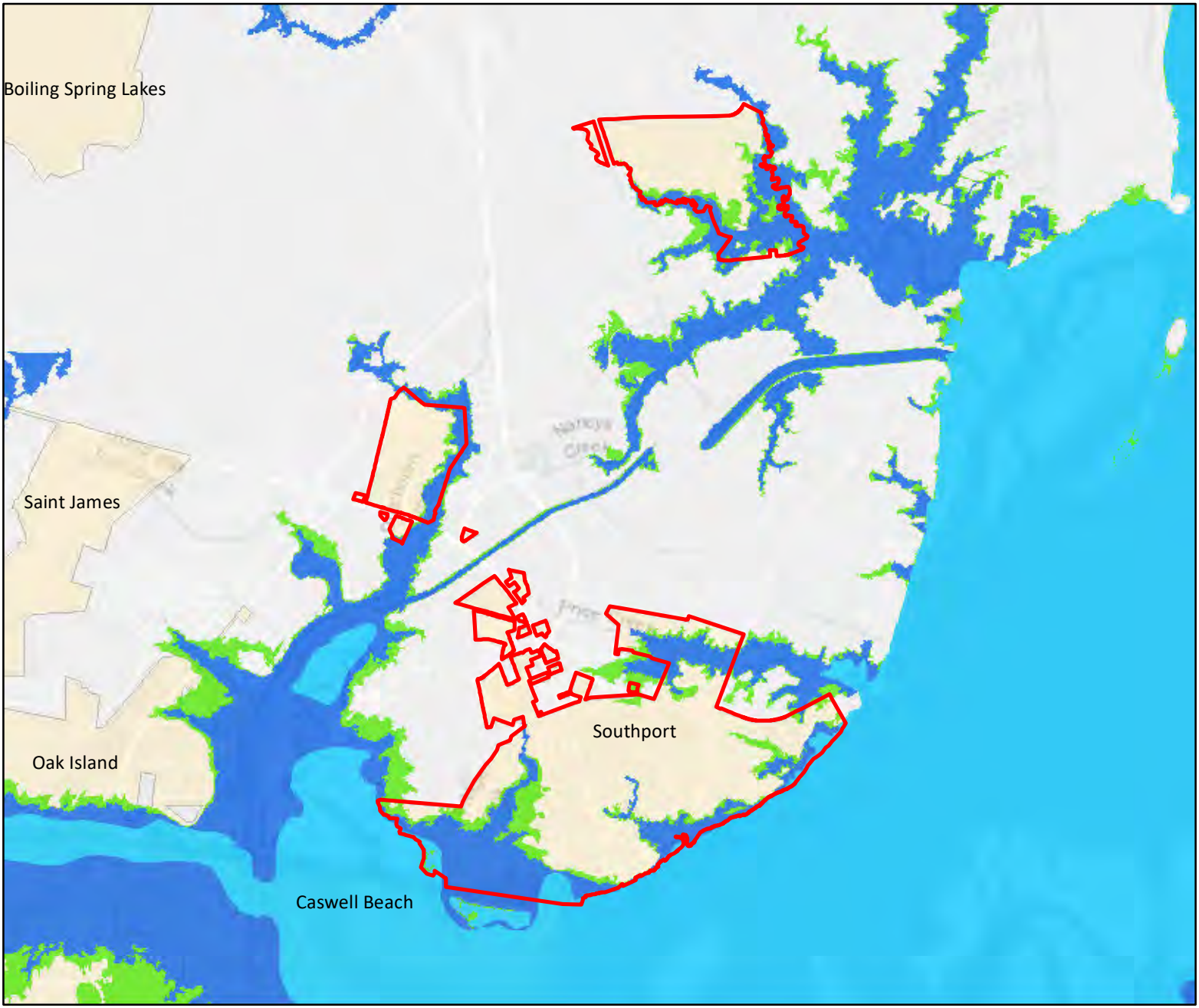
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.75 1.5 3 Miles

N

Southport - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

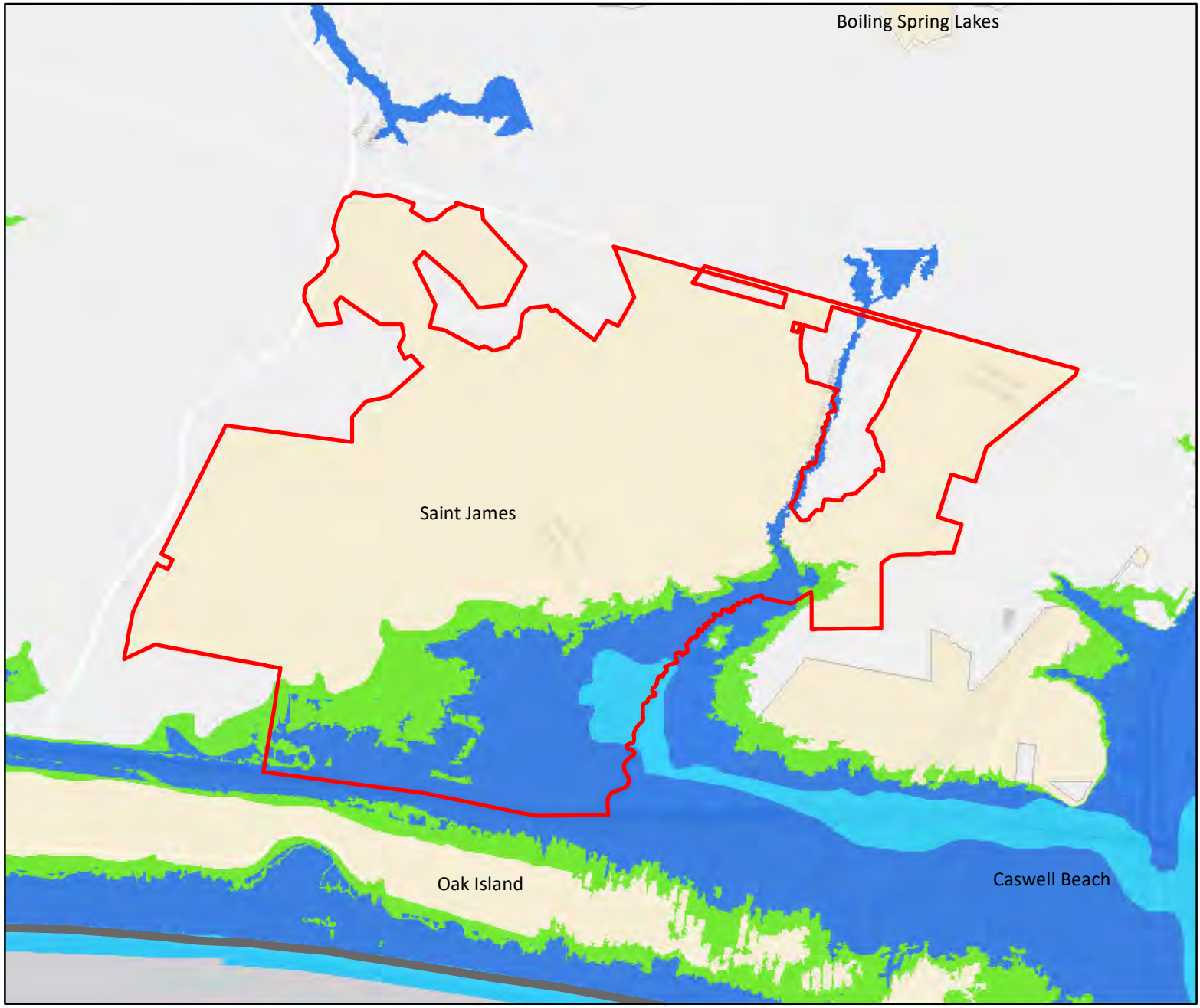
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Saint James - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

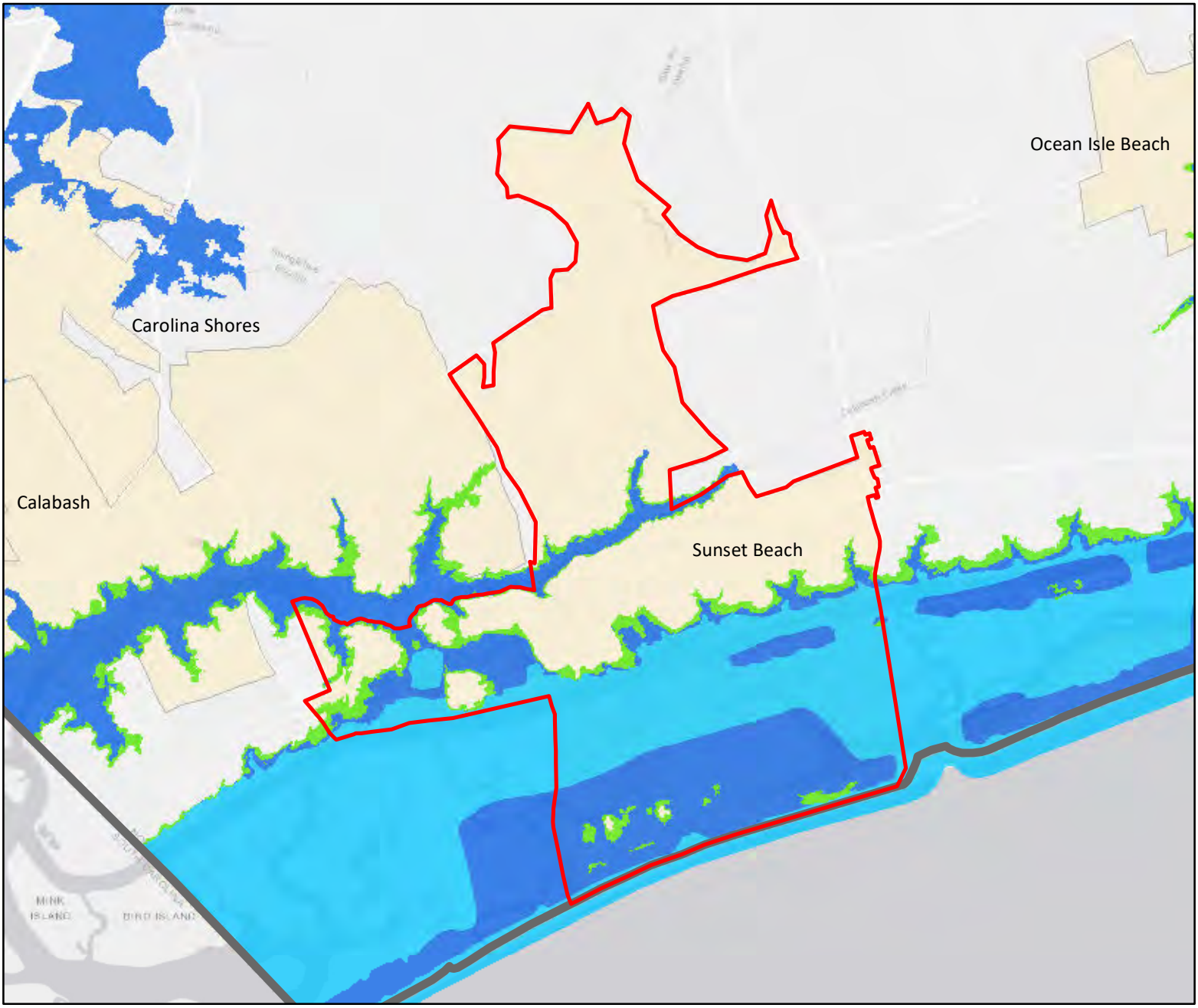
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.45 0.9 1.8 Miles

N

Sunset Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

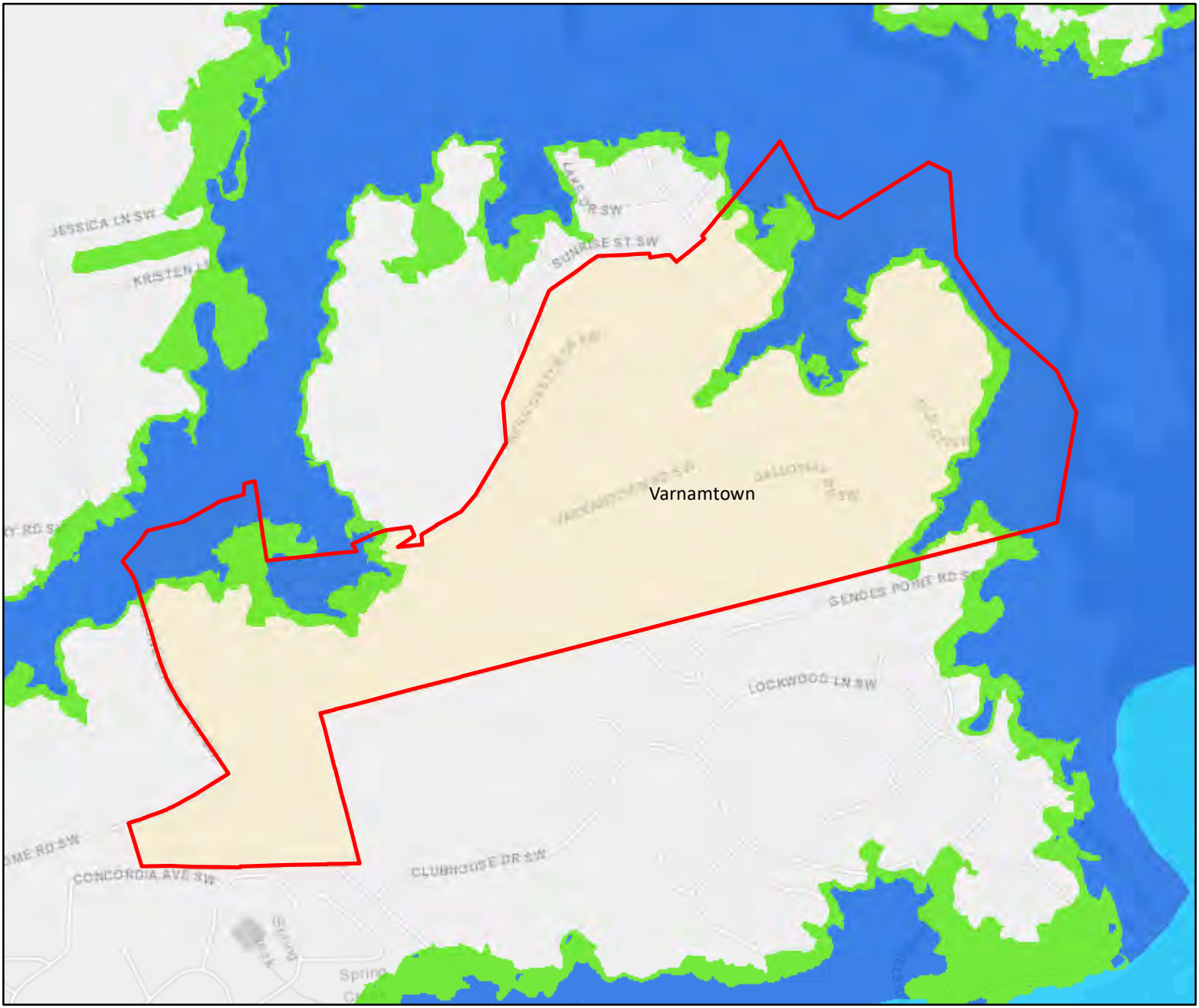
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Varnamtown - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

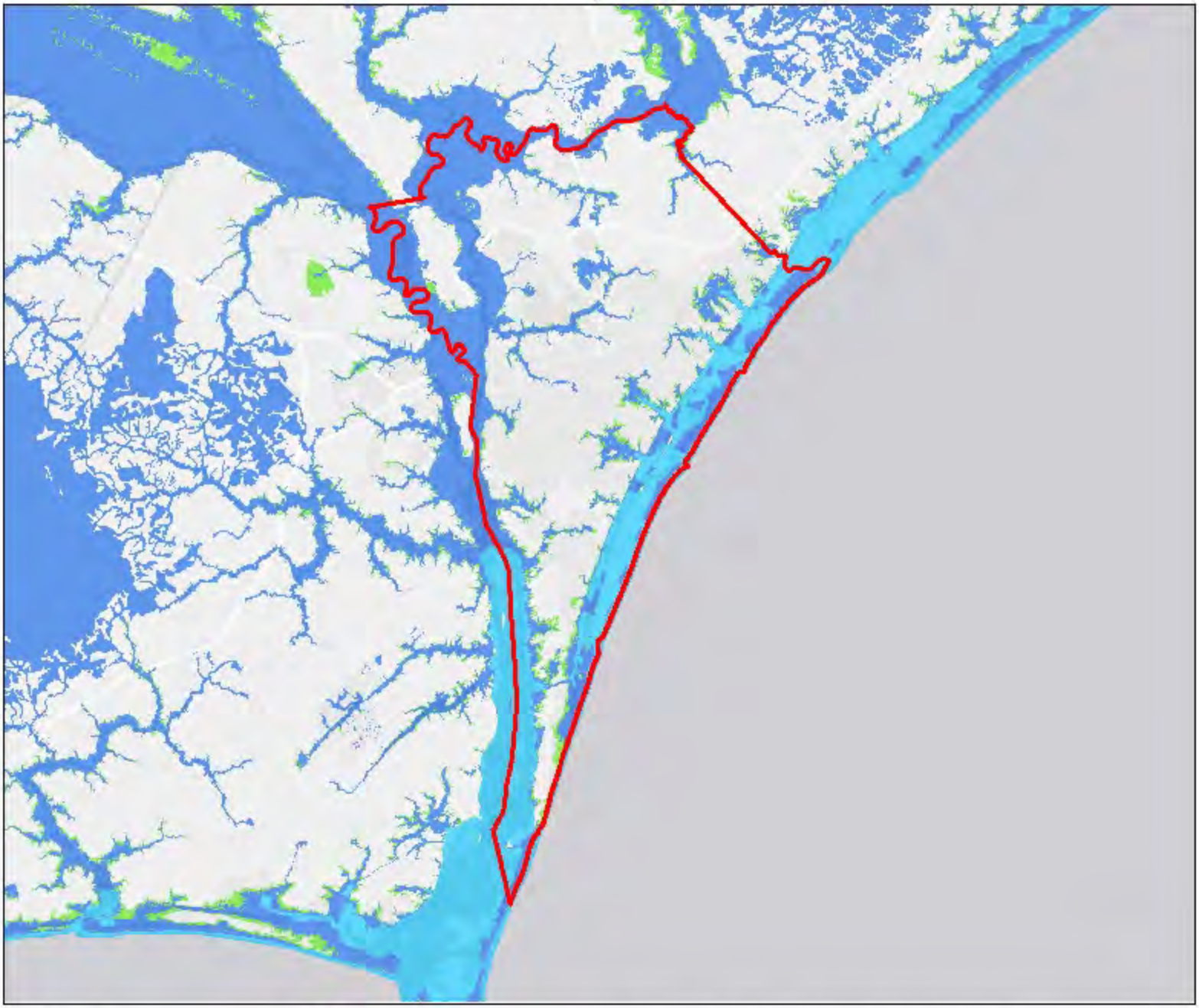
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.15 0.3 0.6 Miles

N

New Hanover County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

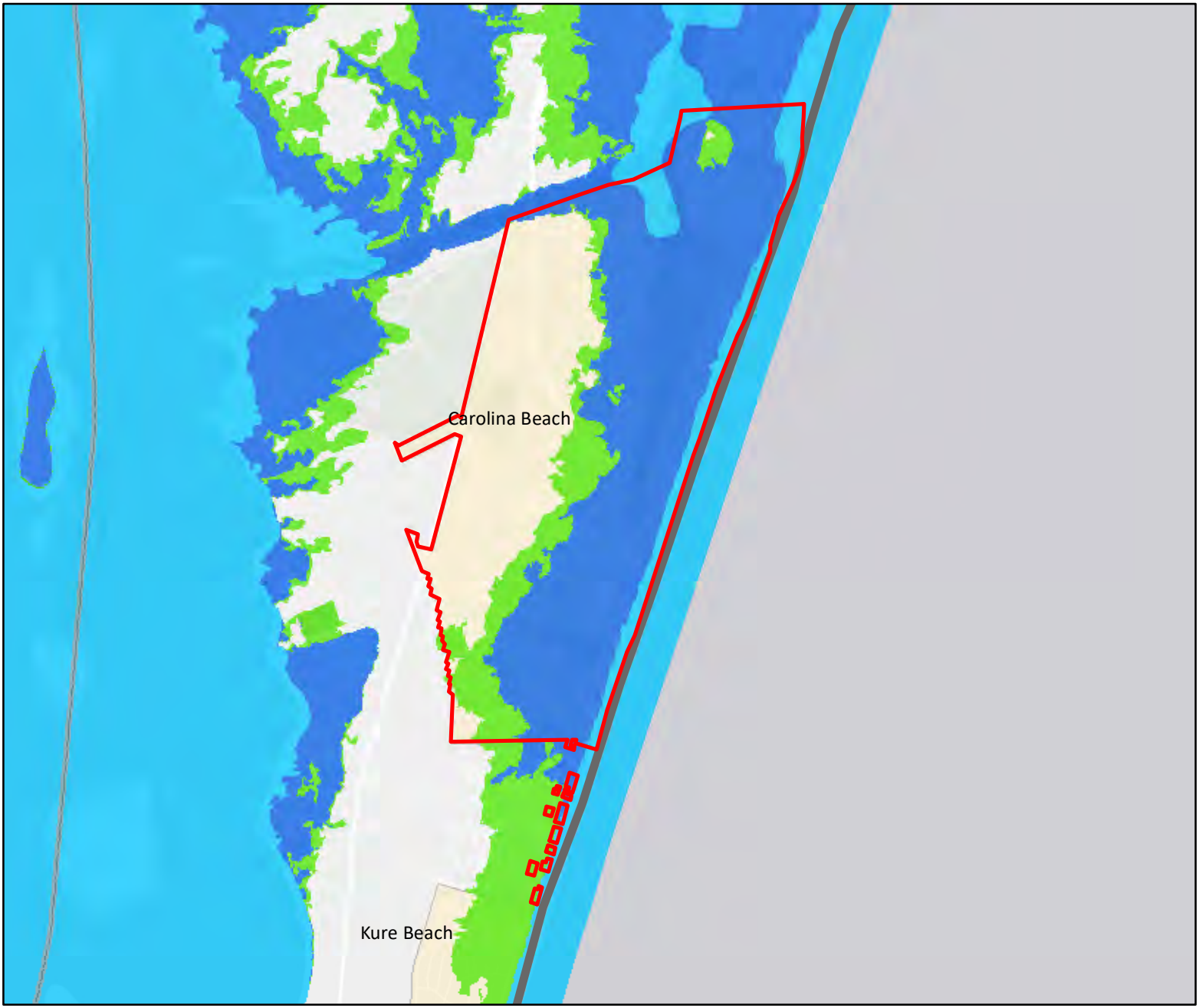
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 3.5 7 14 Miles

N

Carolina Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

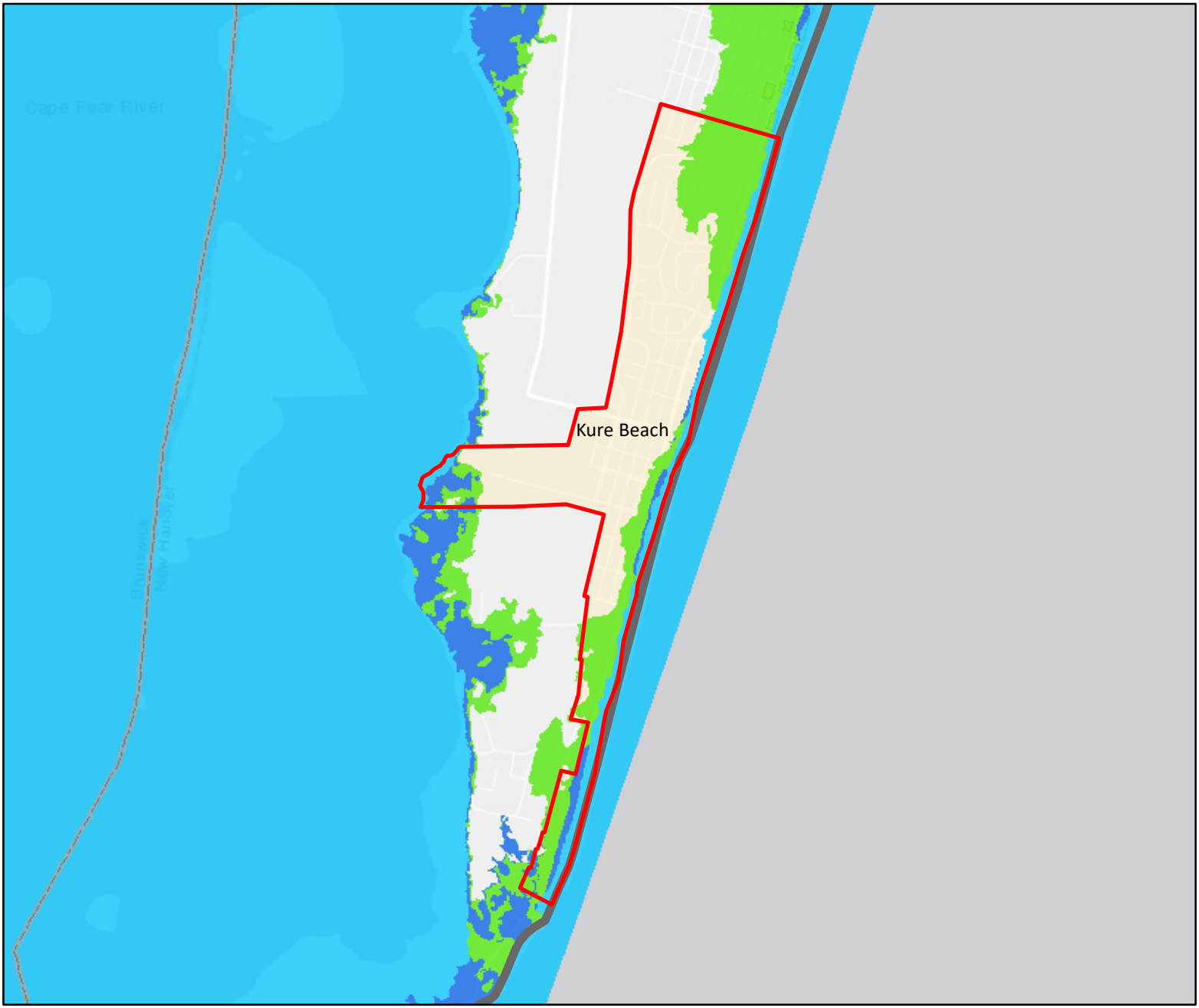
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.35 0.7 1.4 Miles

N

Kure Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

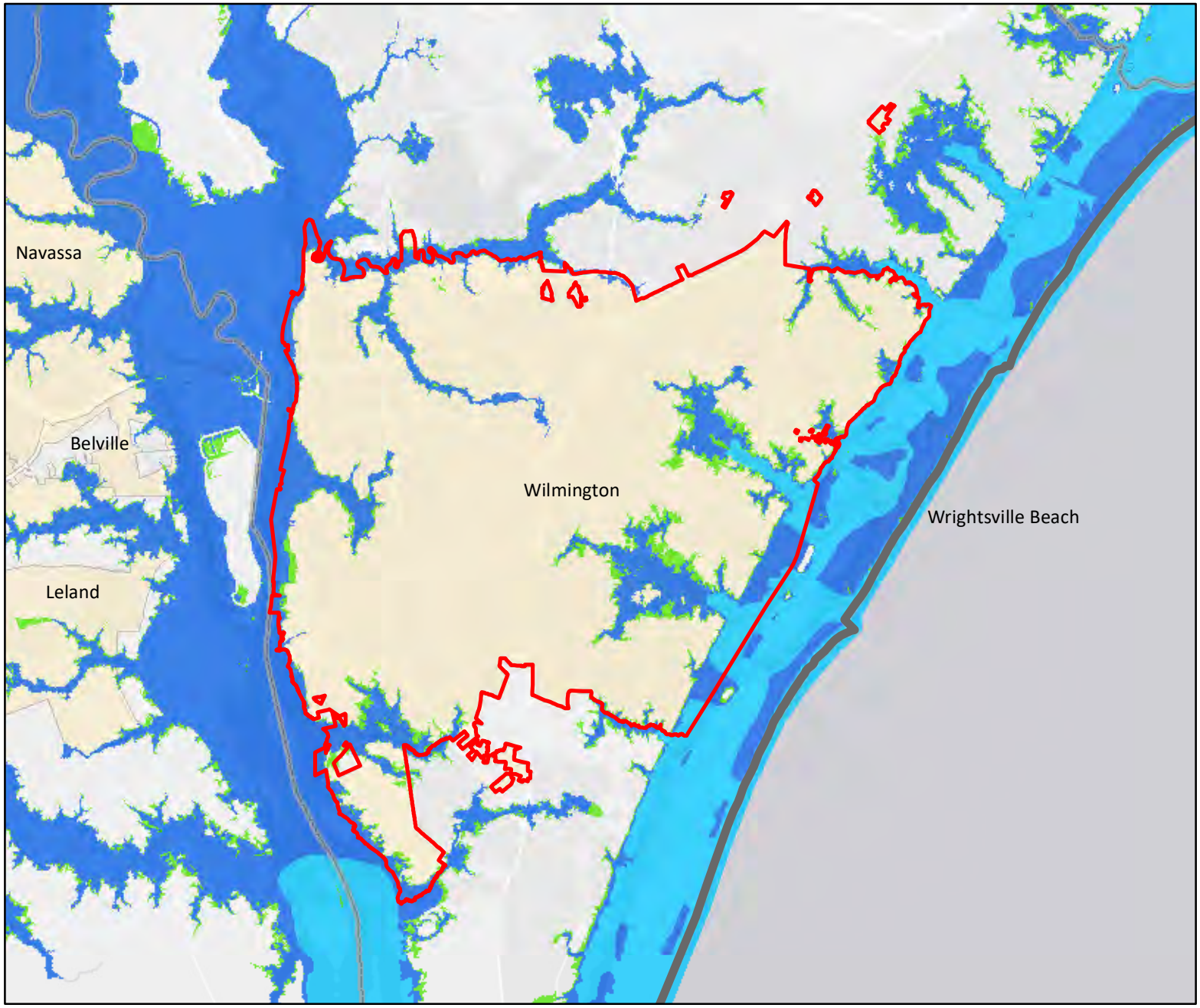
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.3 0.6 1.2 Miles

N

Wilmington - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

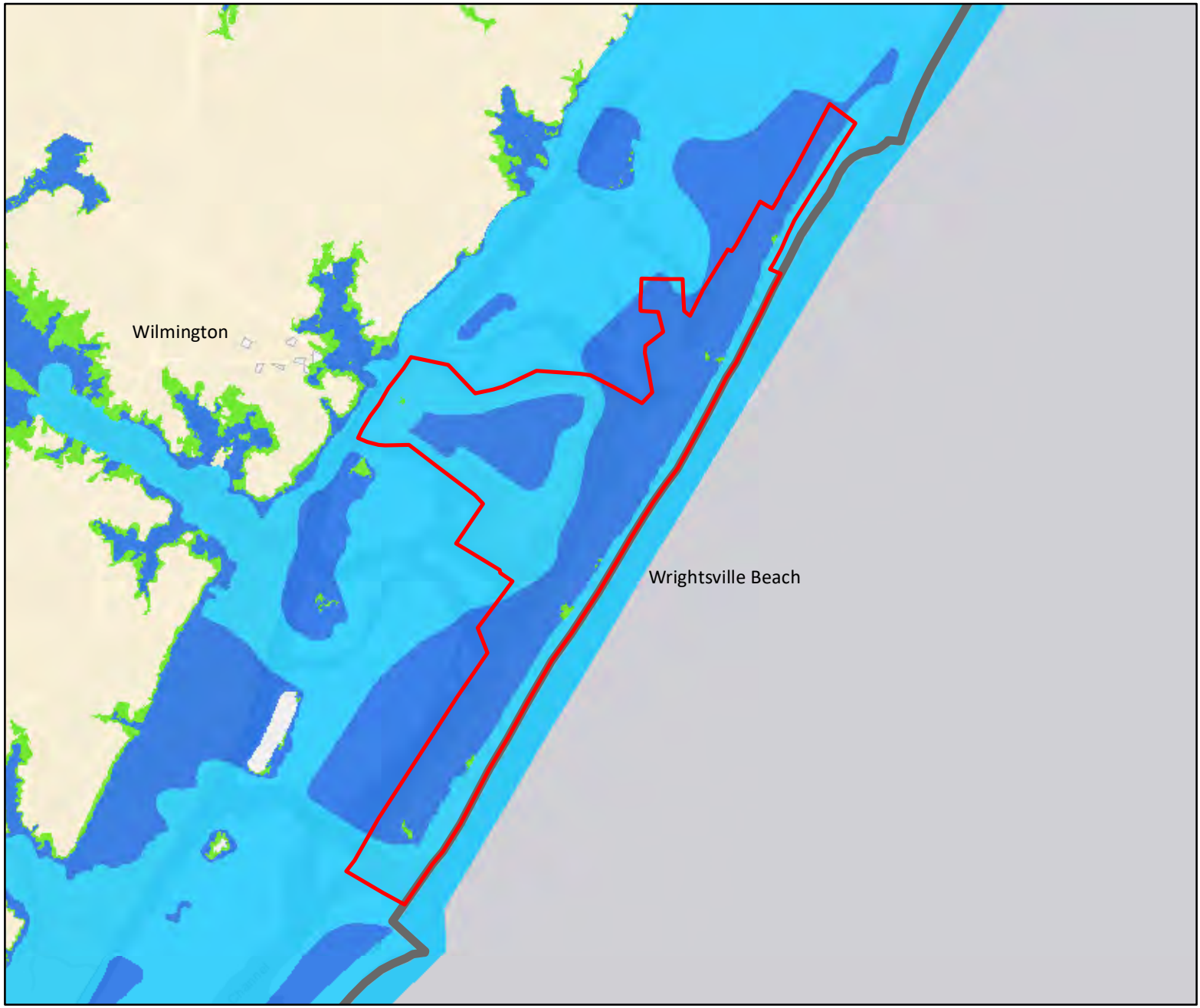
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 1.25 2.5 5 Miles

N

Wrightsville Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

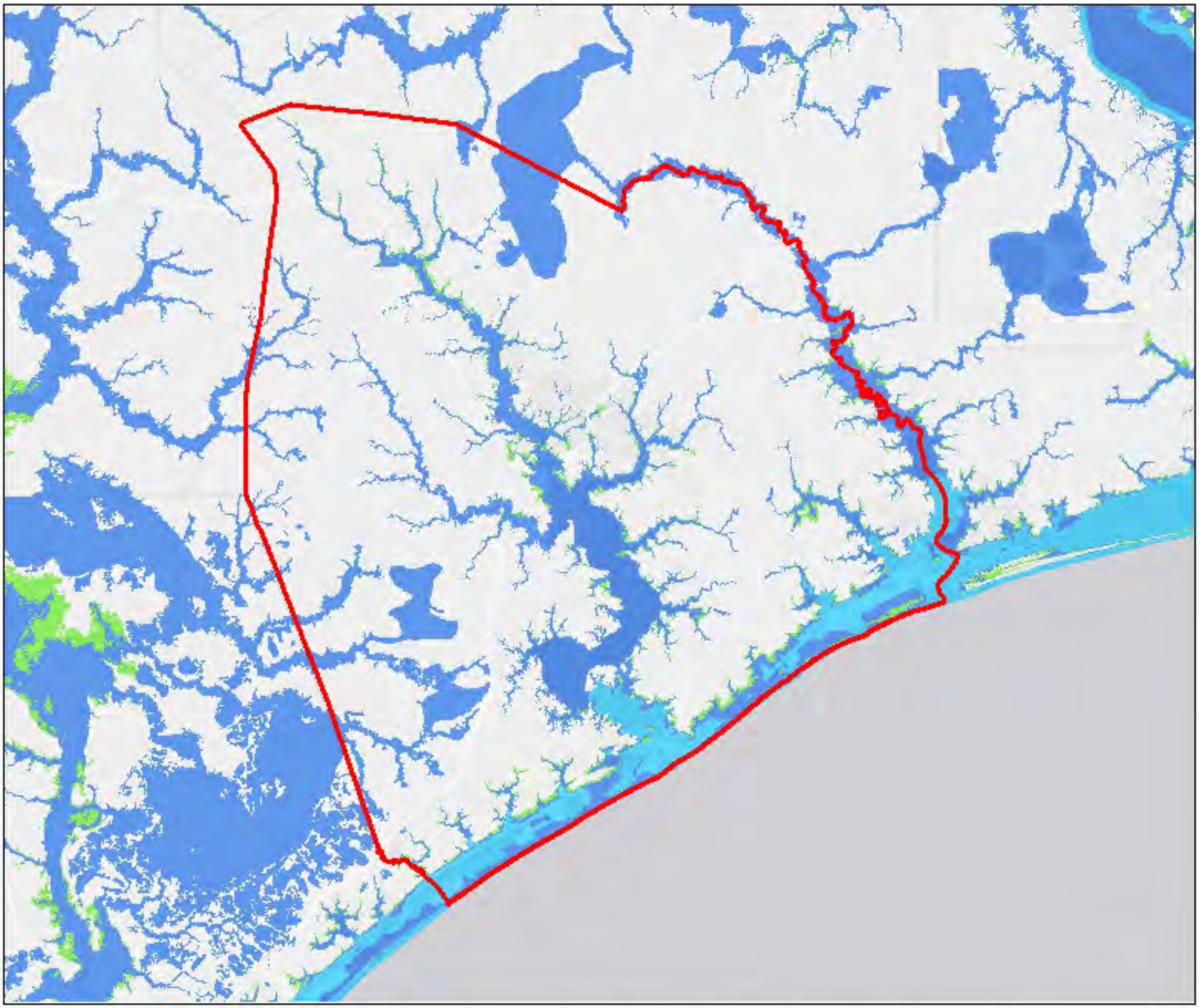
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.4 0.8 1.6 Miles

N

Onslow County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

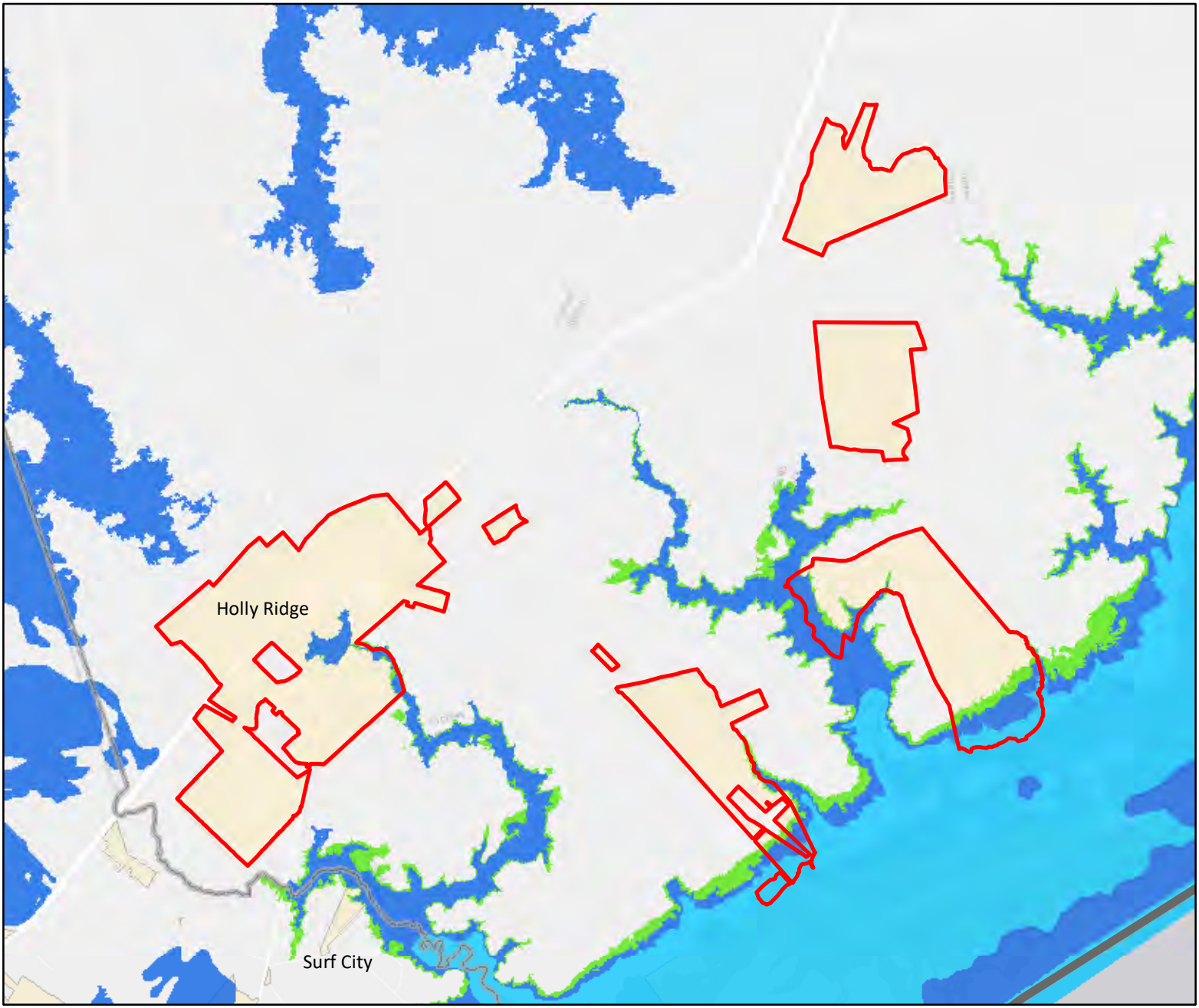
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 4 8 16 Miles

N

Holly Ridge - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

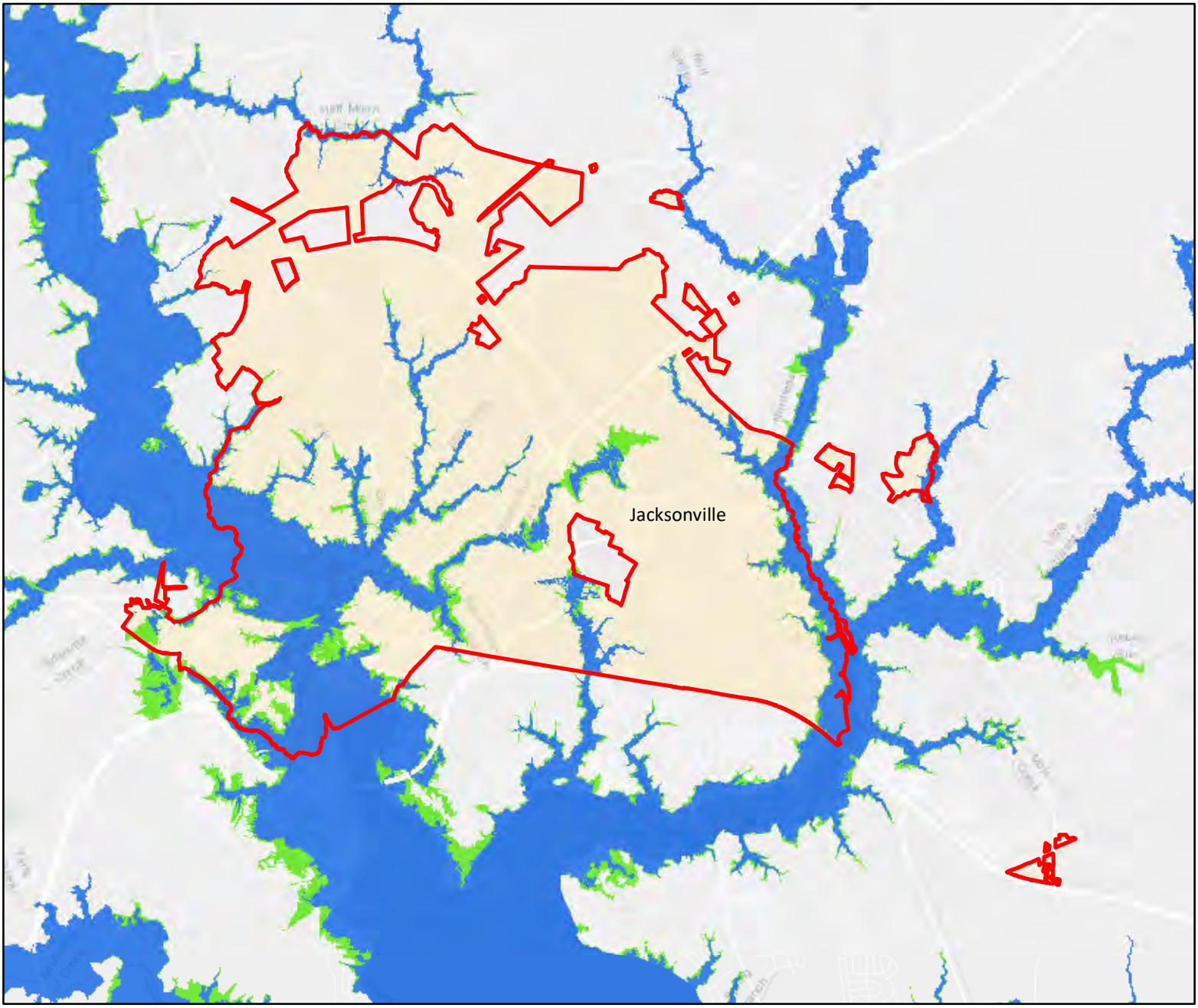
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Jacksonville - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.75 1.5 3 Miles

N

North Topsail Beach - Flood Hazard Areas

Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

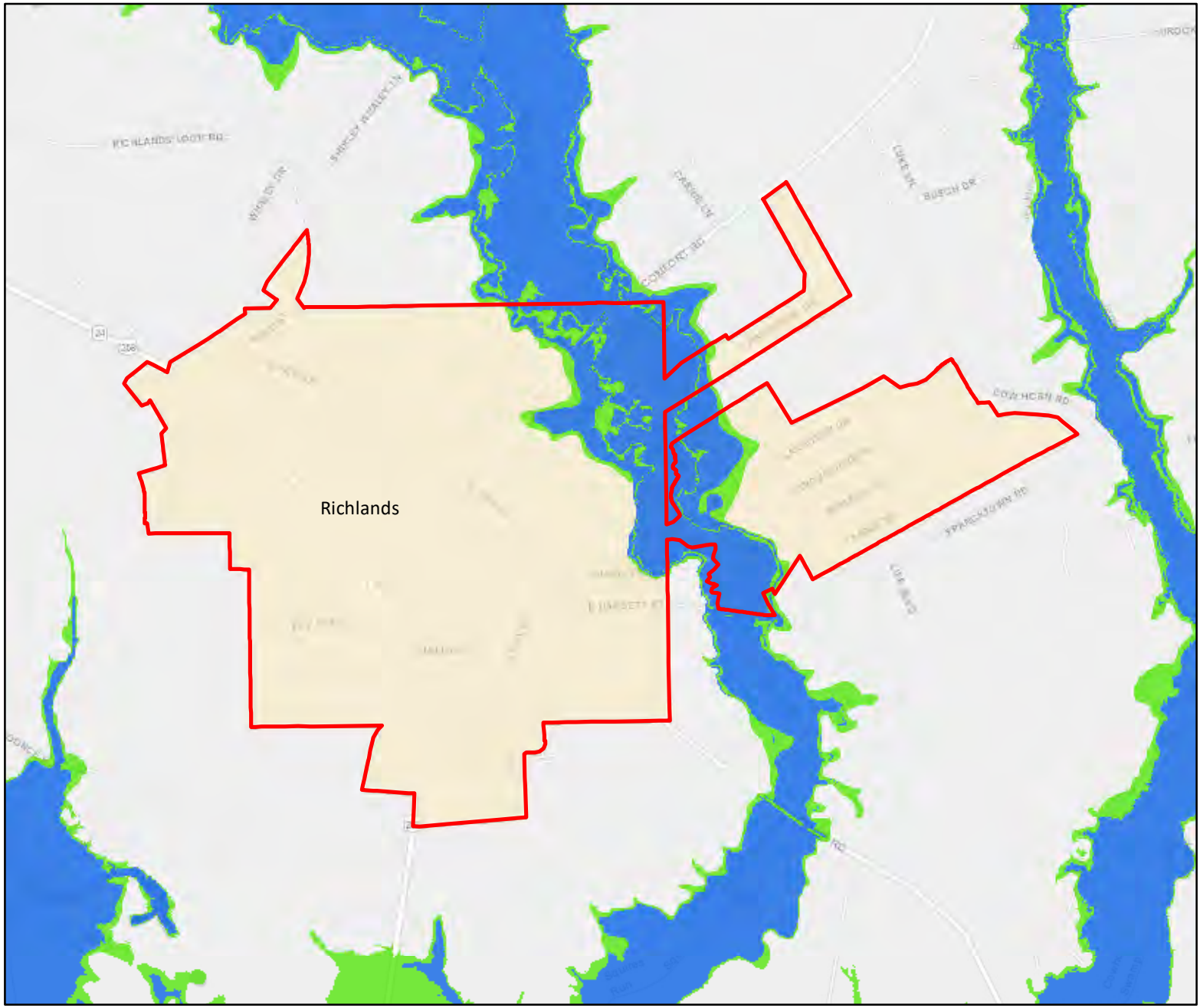
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 1 2 4 Miles

N

Richlands - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

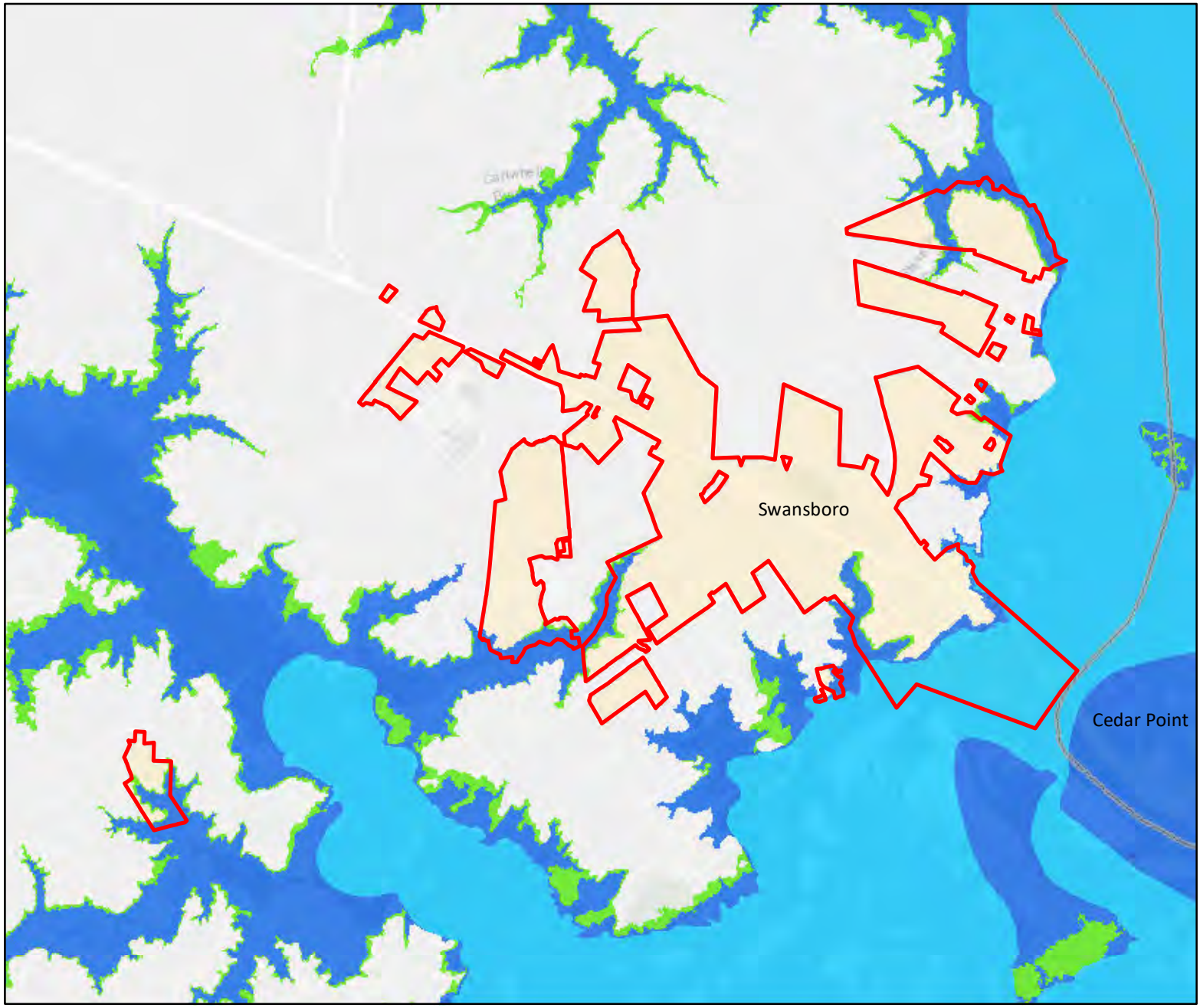
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.2 0.4 0.8 Miles

N

Swansboro - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

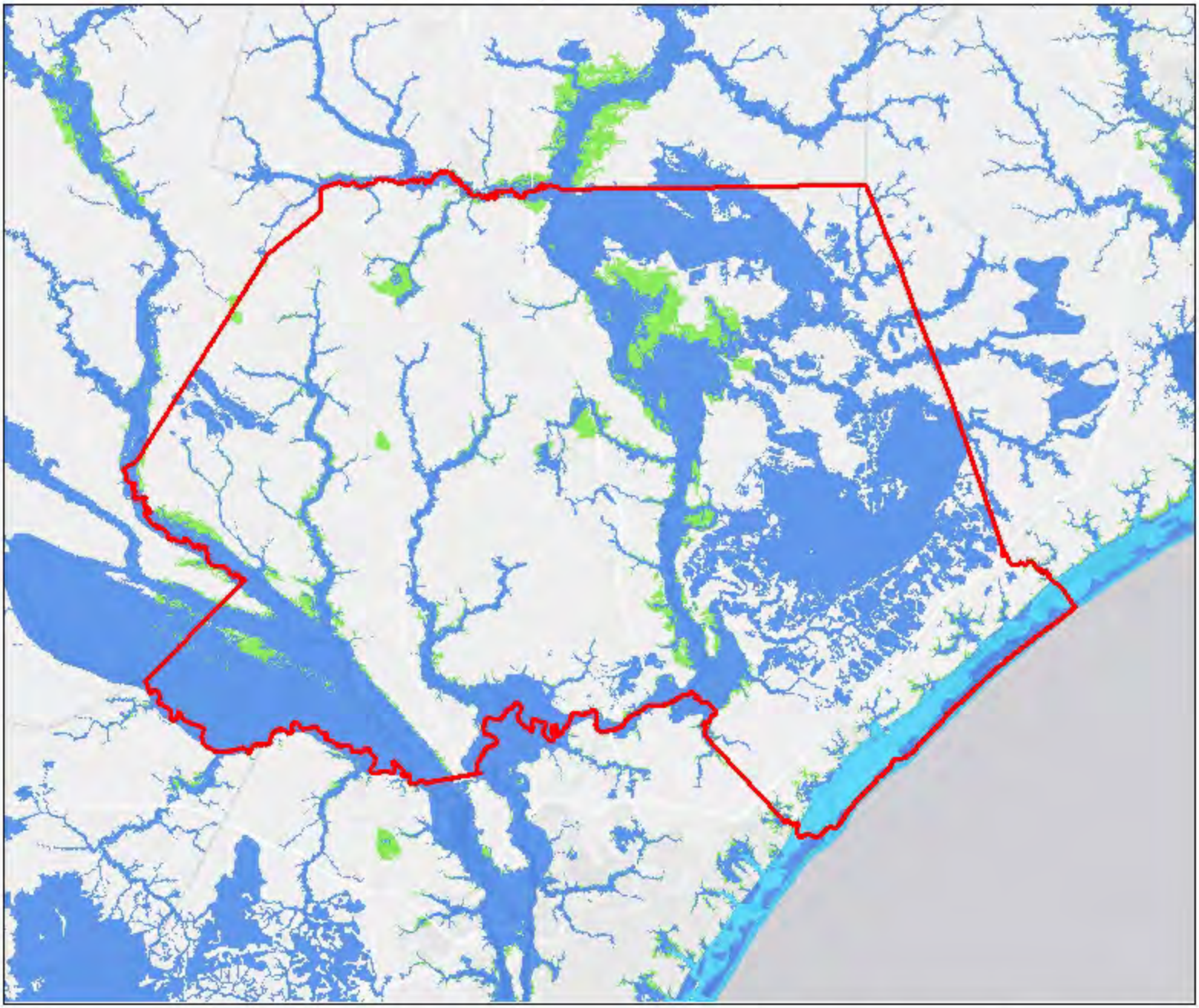
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.35 0.7 1.4 Miles

N

Pender County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

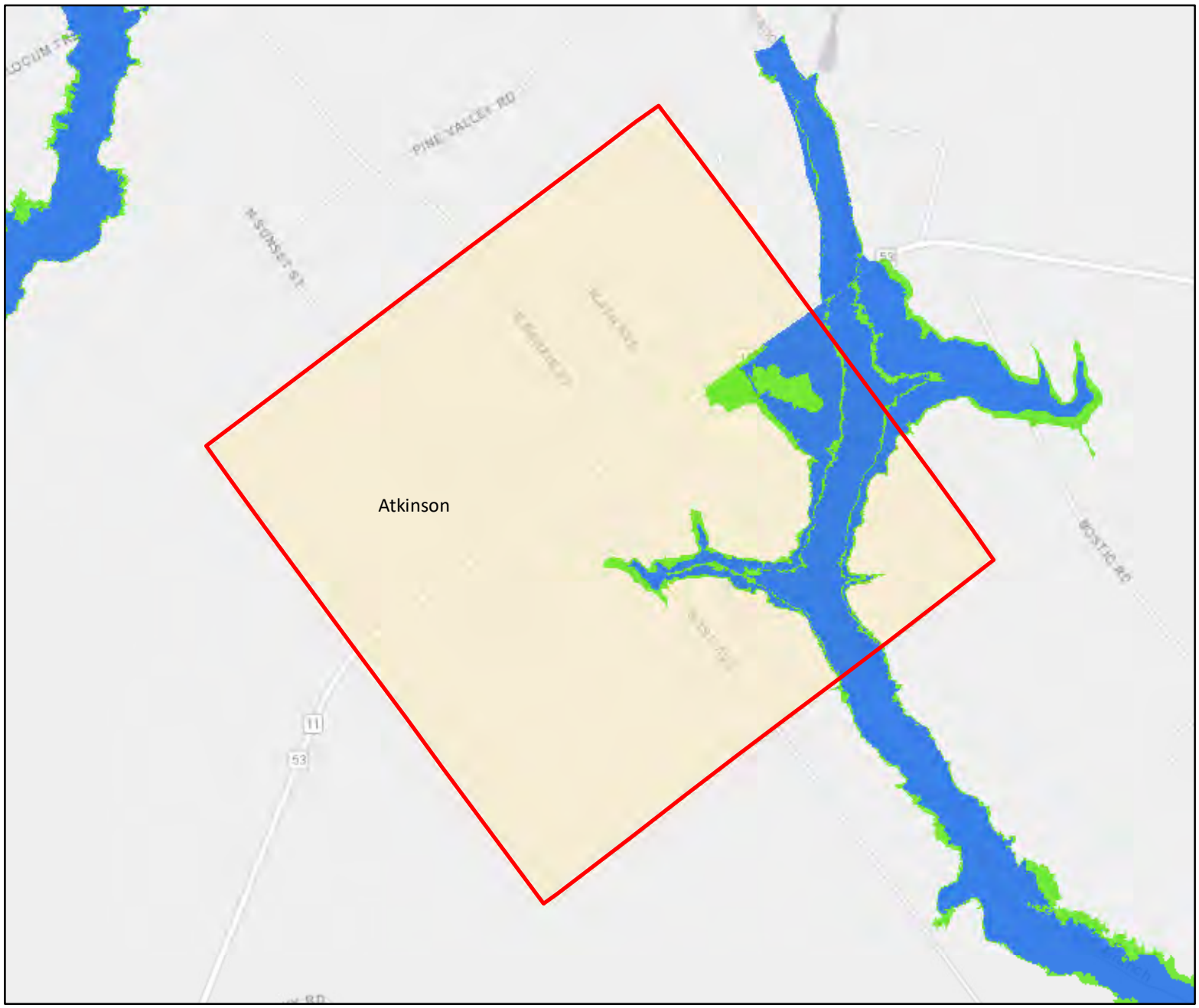
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 4 8 16 Miles

N

Atkinson - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

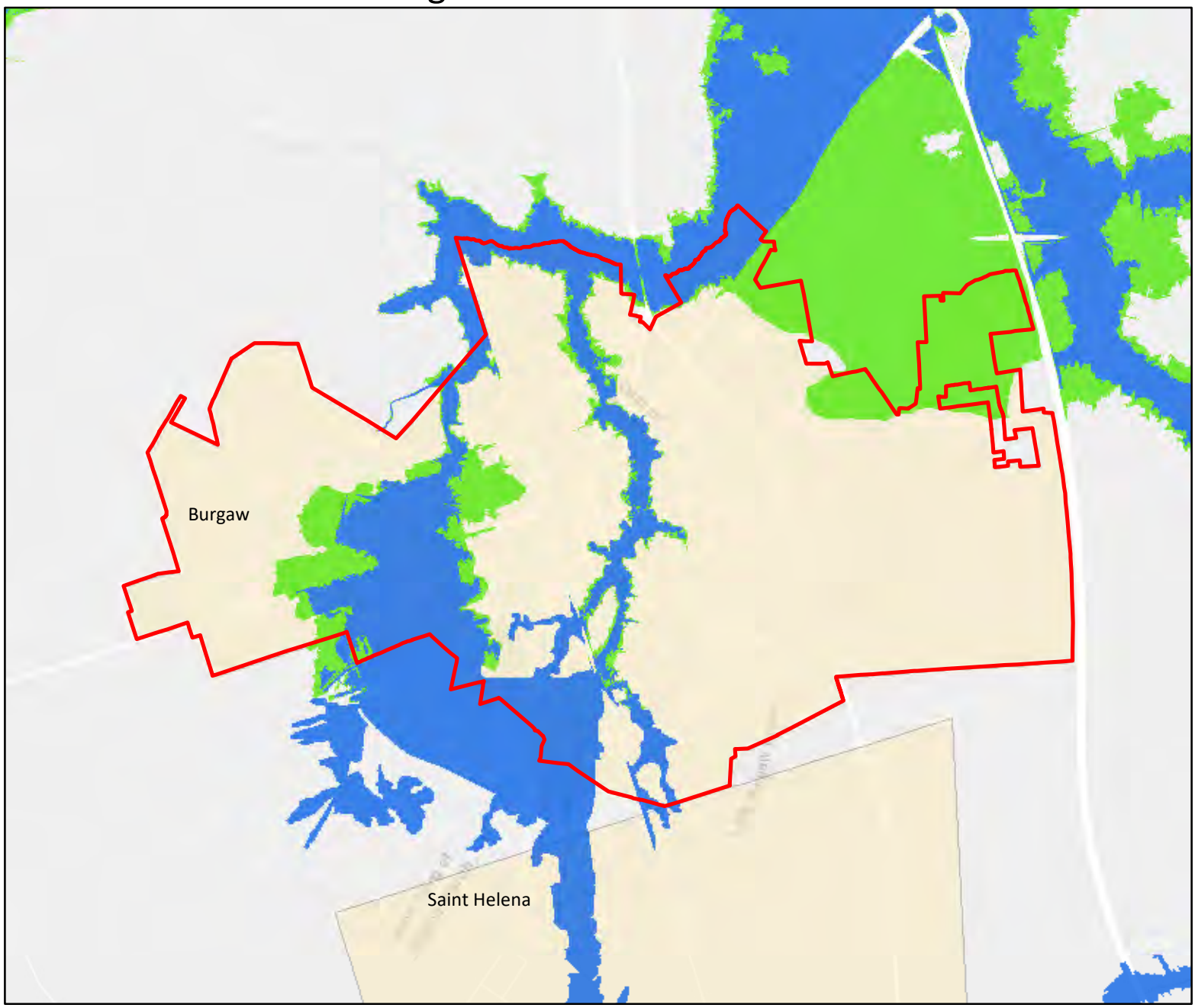
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.15 0.3 0.6 Miles

N

Burgaw - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

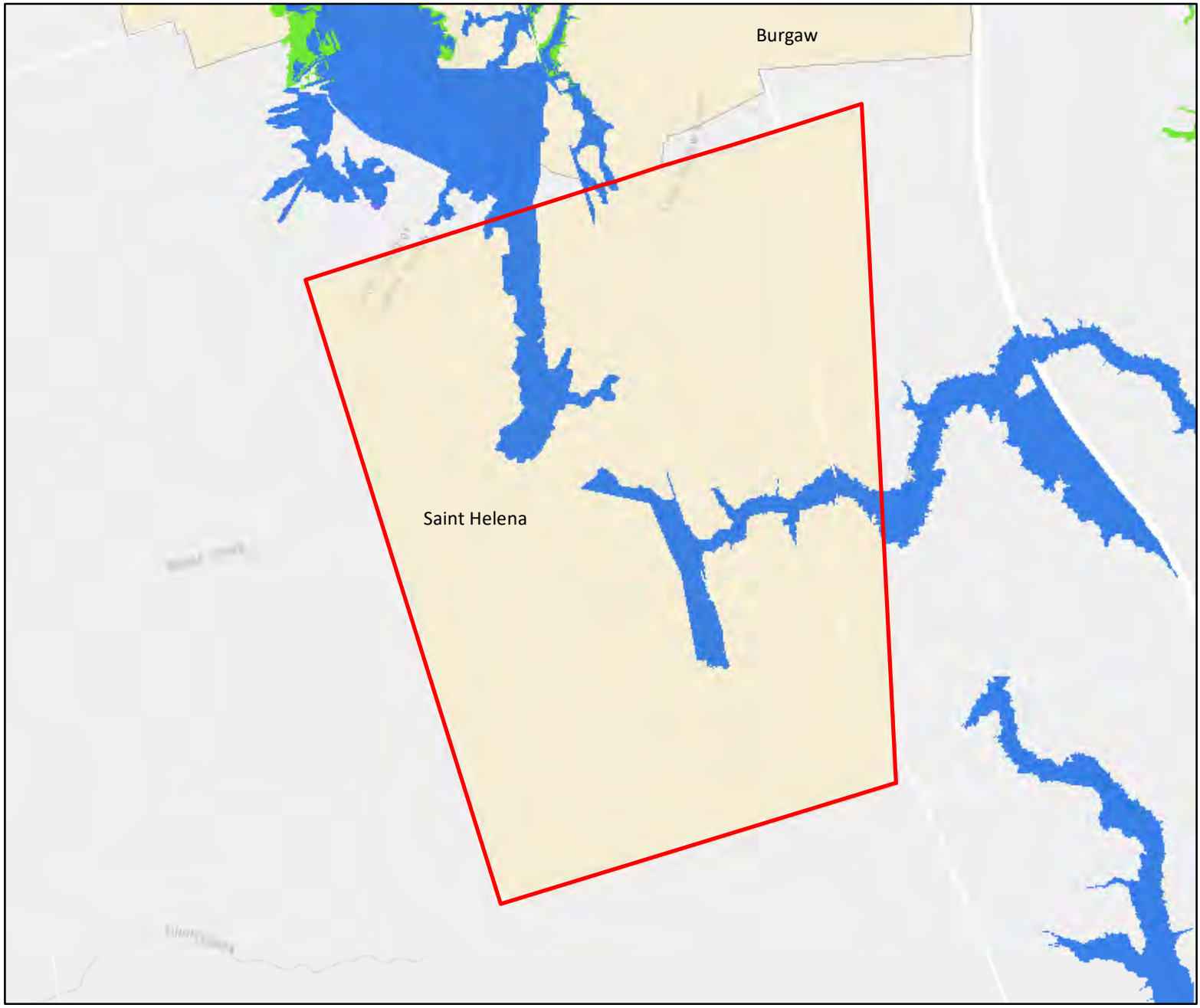
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.325 0.65 1.3 Miles

N

Saint Helena - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

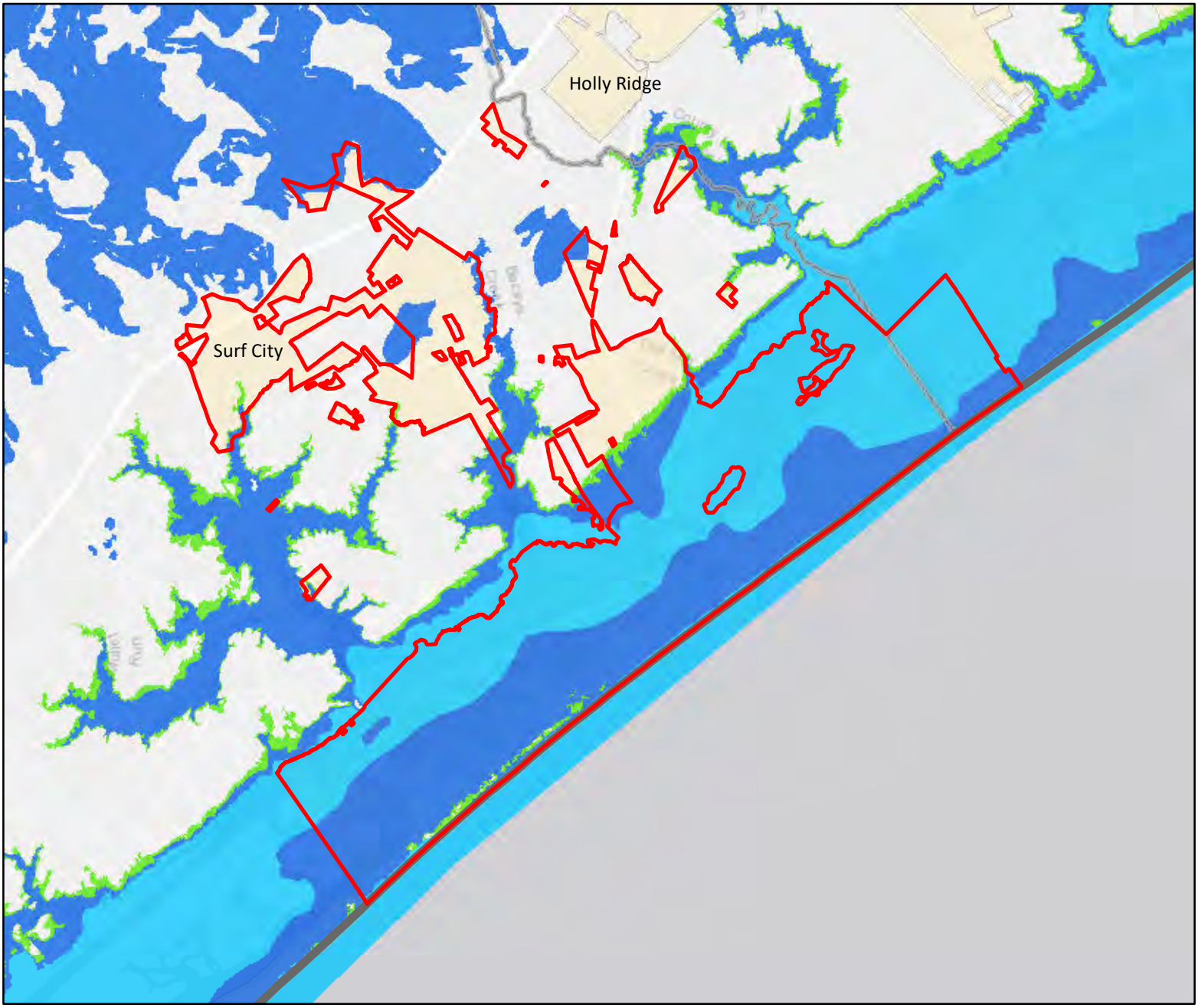
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.35 0.7 1.4 Miles

N

Surf City - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

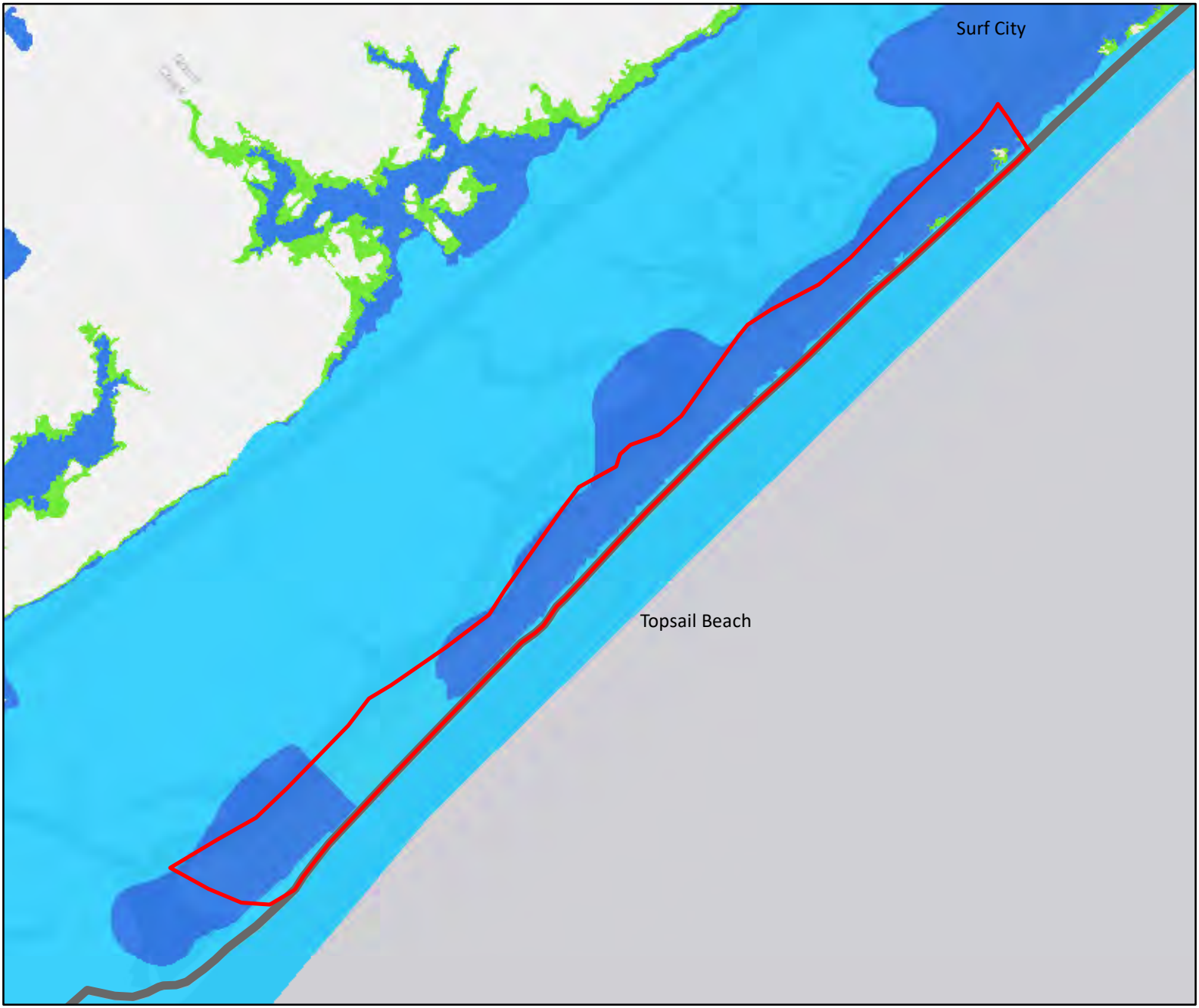
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Topsail Beach - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.35 0.7 1.4 Miles

N

Watha - Flood Hazard Areas

Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

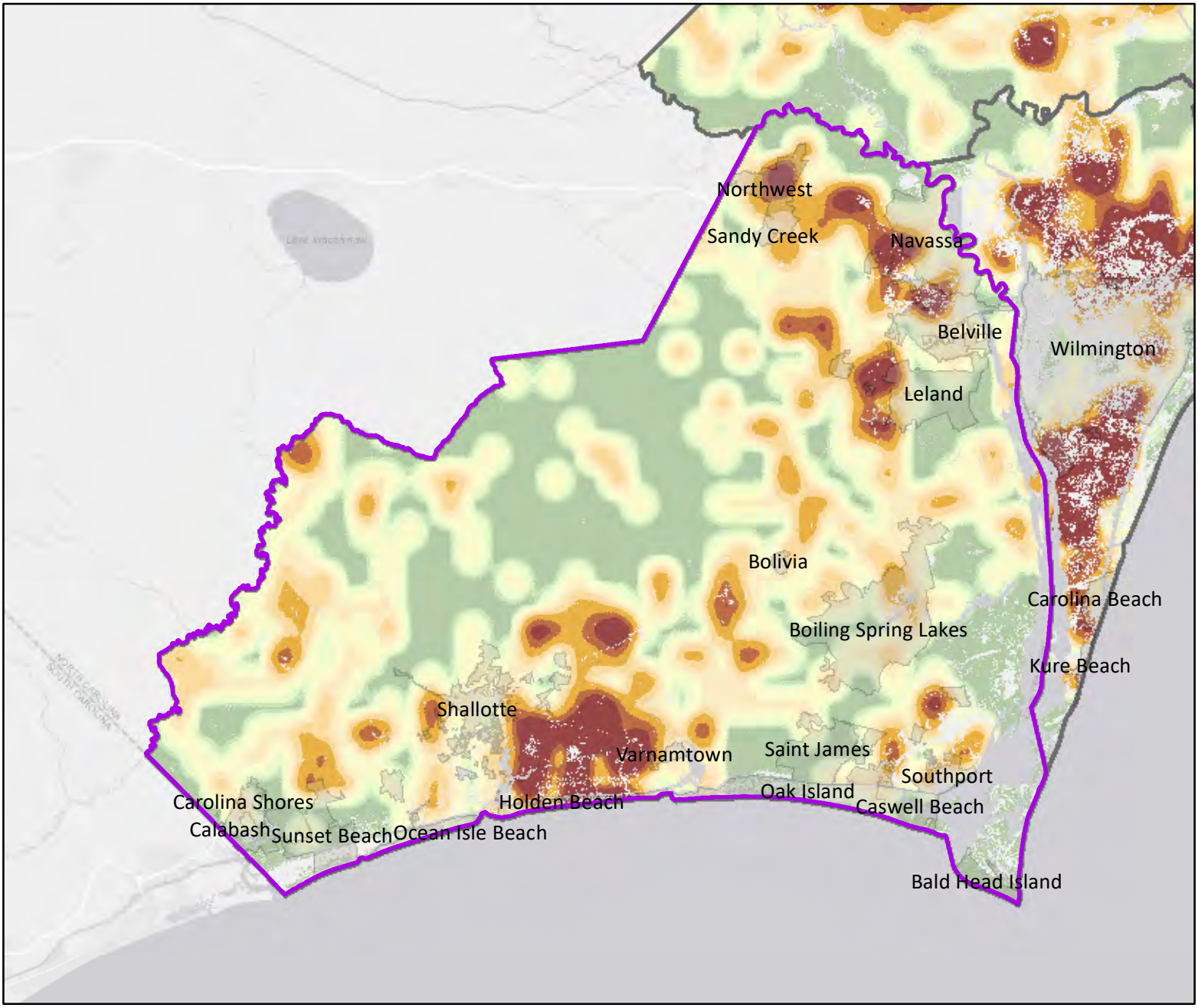
0 0.125 0.25 0.5 Miles

N

Appendix G
Wildfire Hazard Maps

This section of the Plan includes Wildfire Ignition Density, Wildfire Events and Wildland Urban Interface maps for each participating County and municipality in the Southeastern NC Region.

Brunswick County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

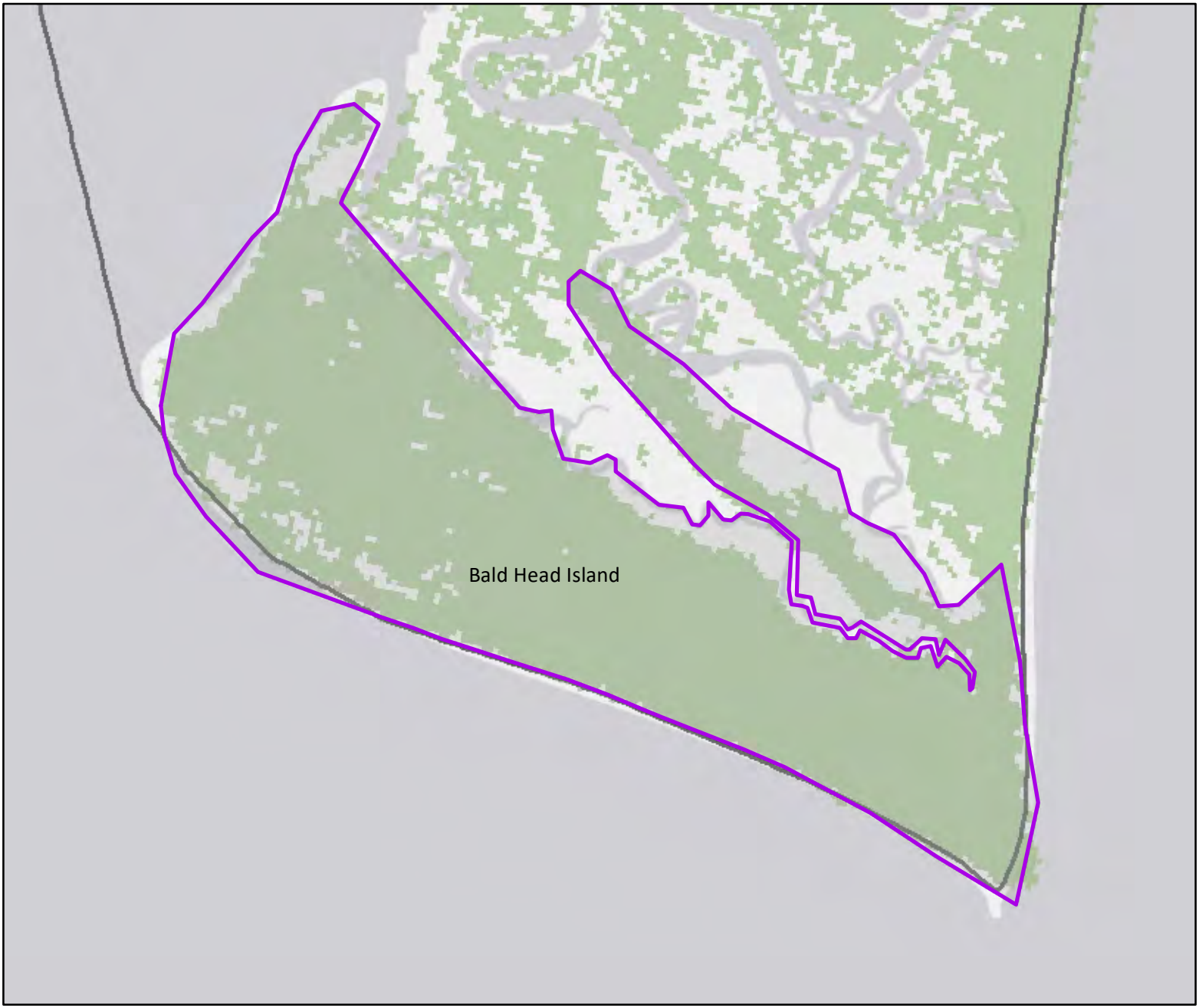
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Bald Head Island - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

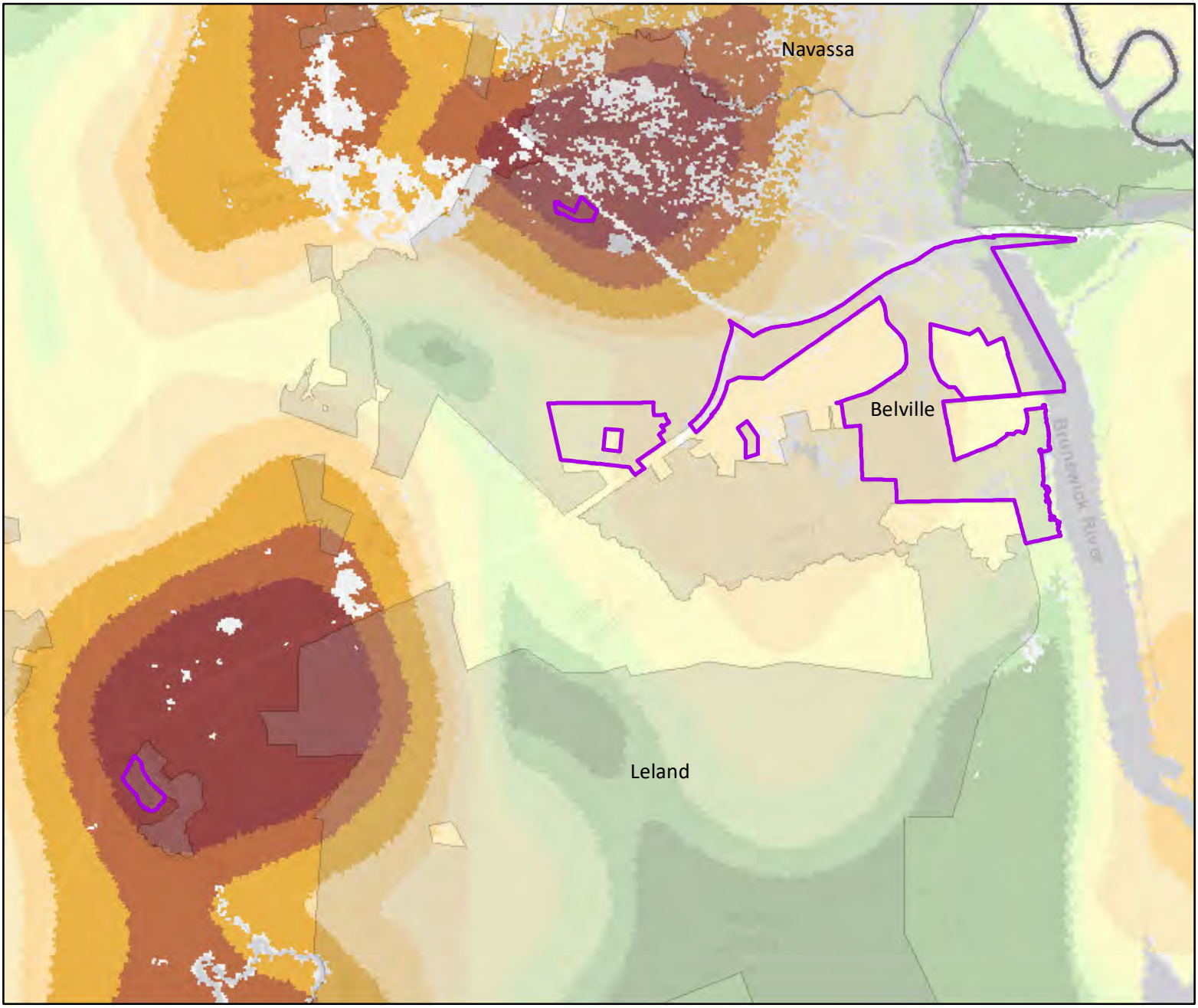
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Belville - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

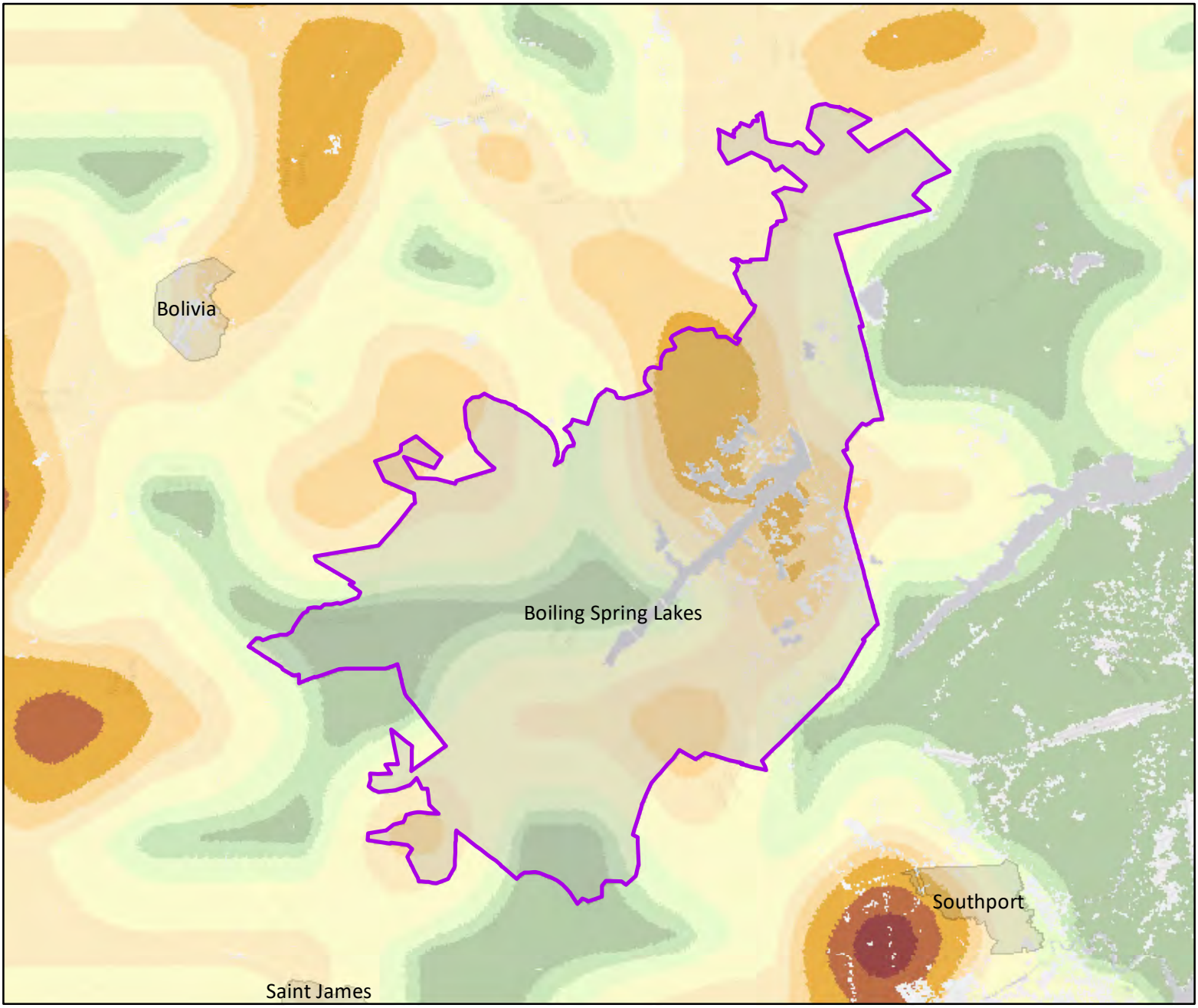
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Boiling Spring Lakes - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

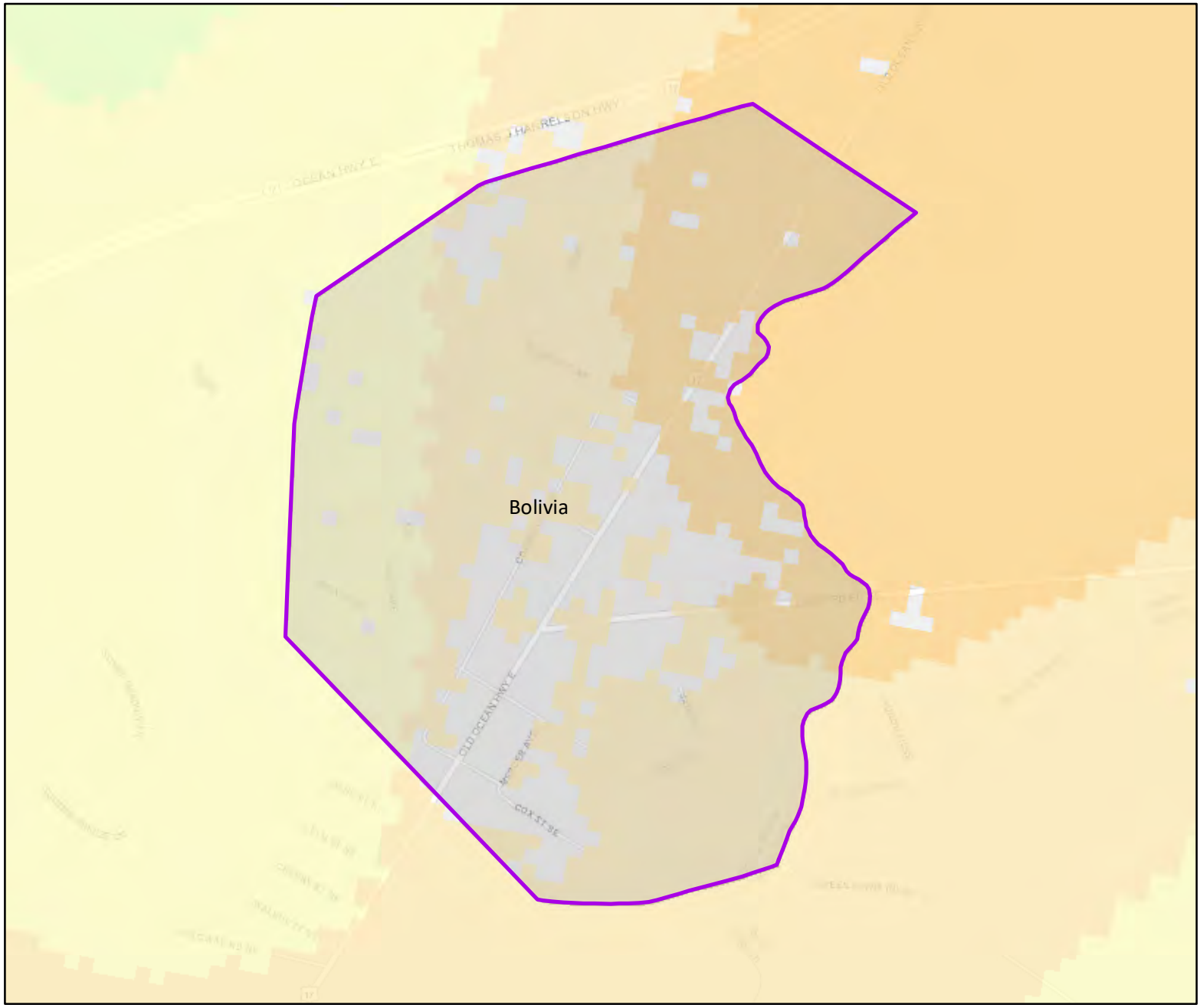
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Bolivia - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

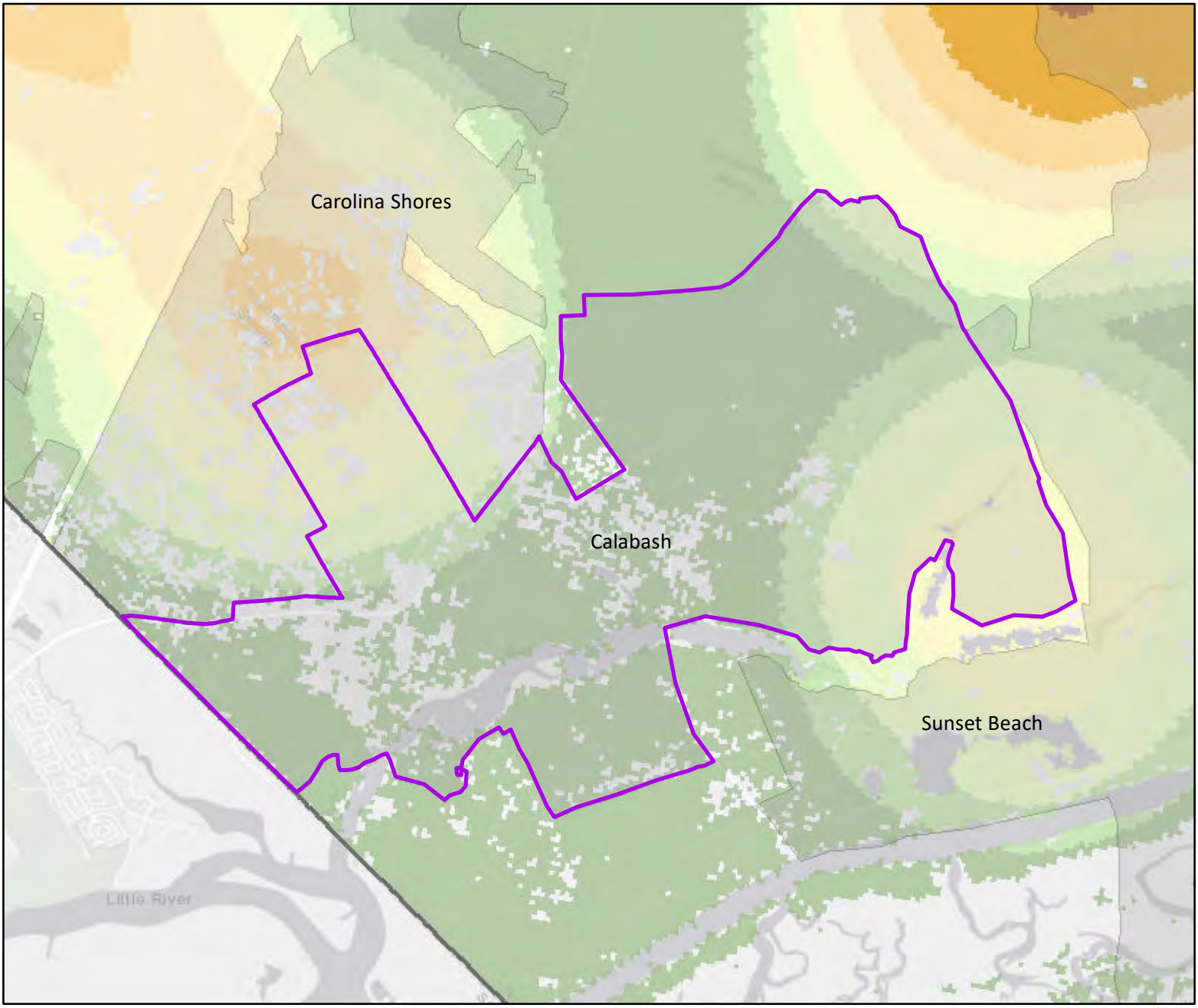
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Calabash - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

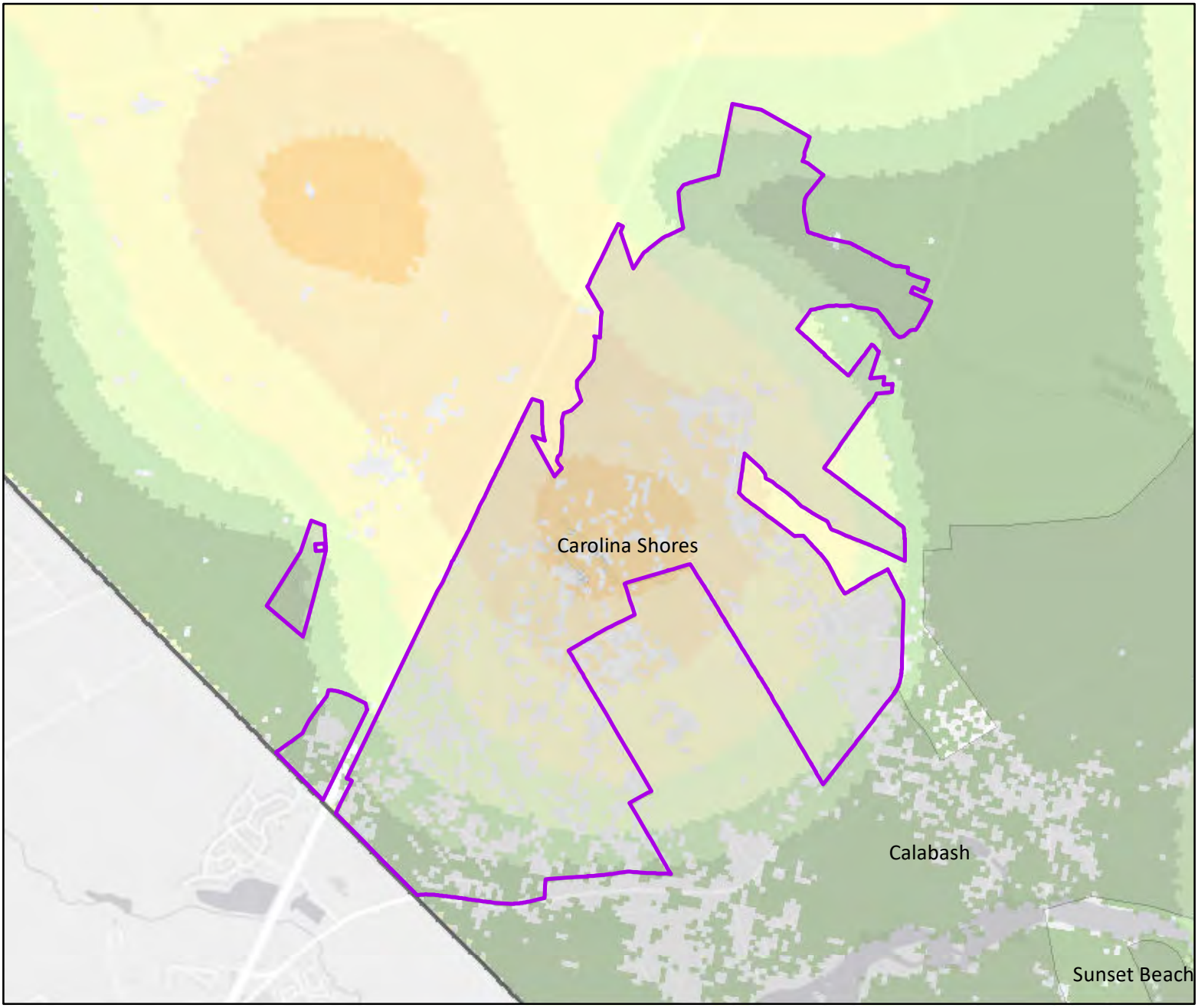
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Carolina Shores - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

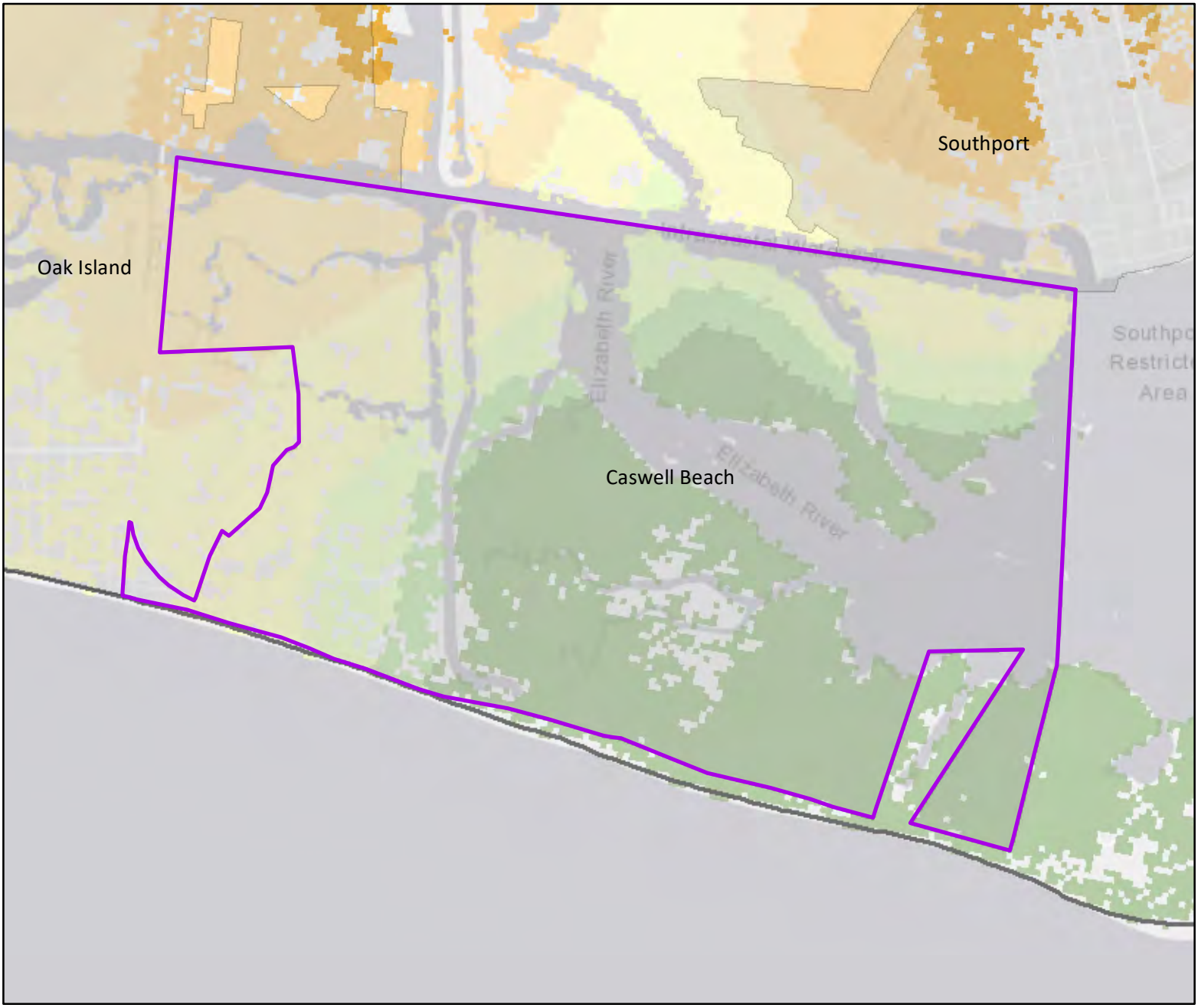
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Caswell Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

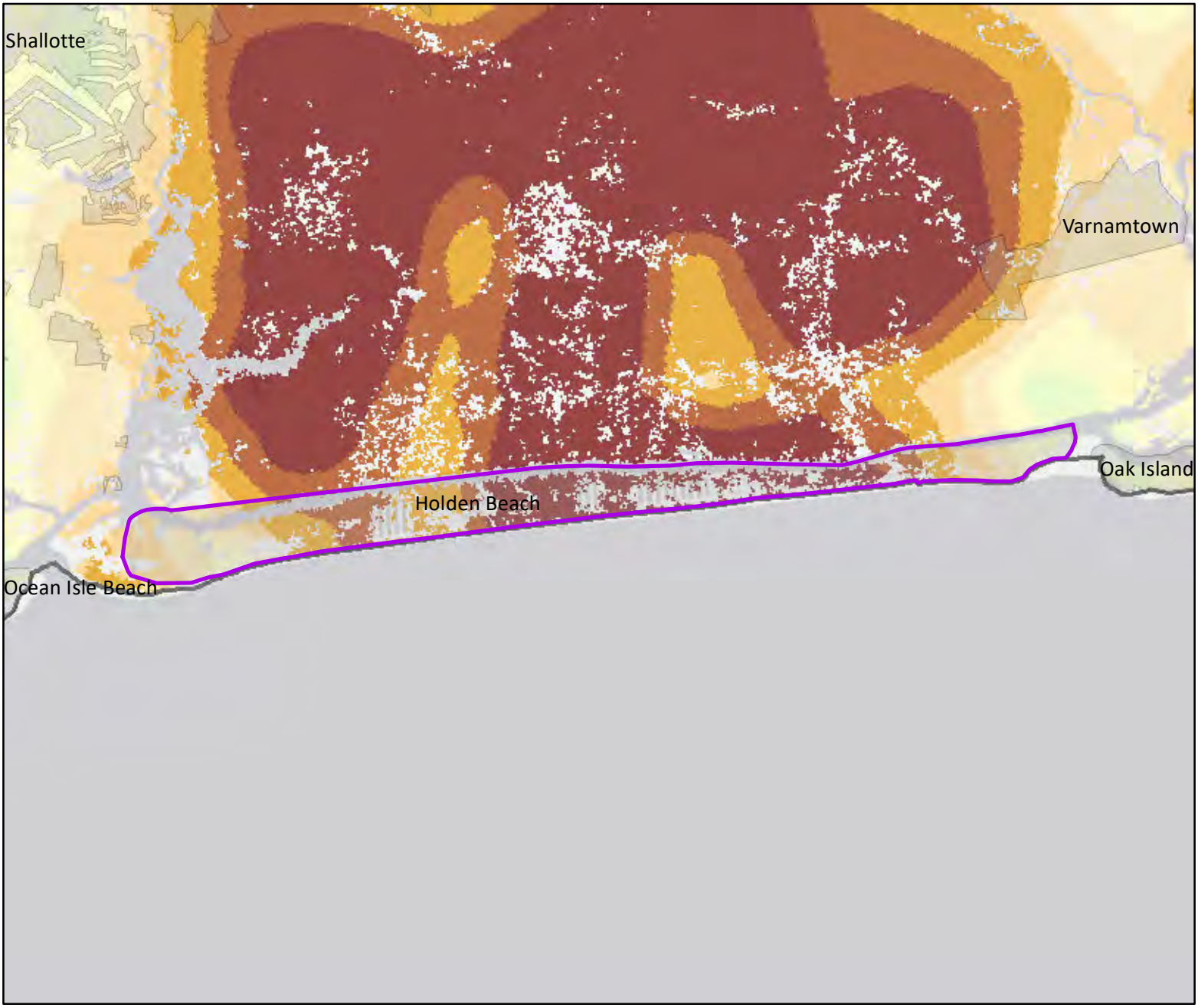
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Holden Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

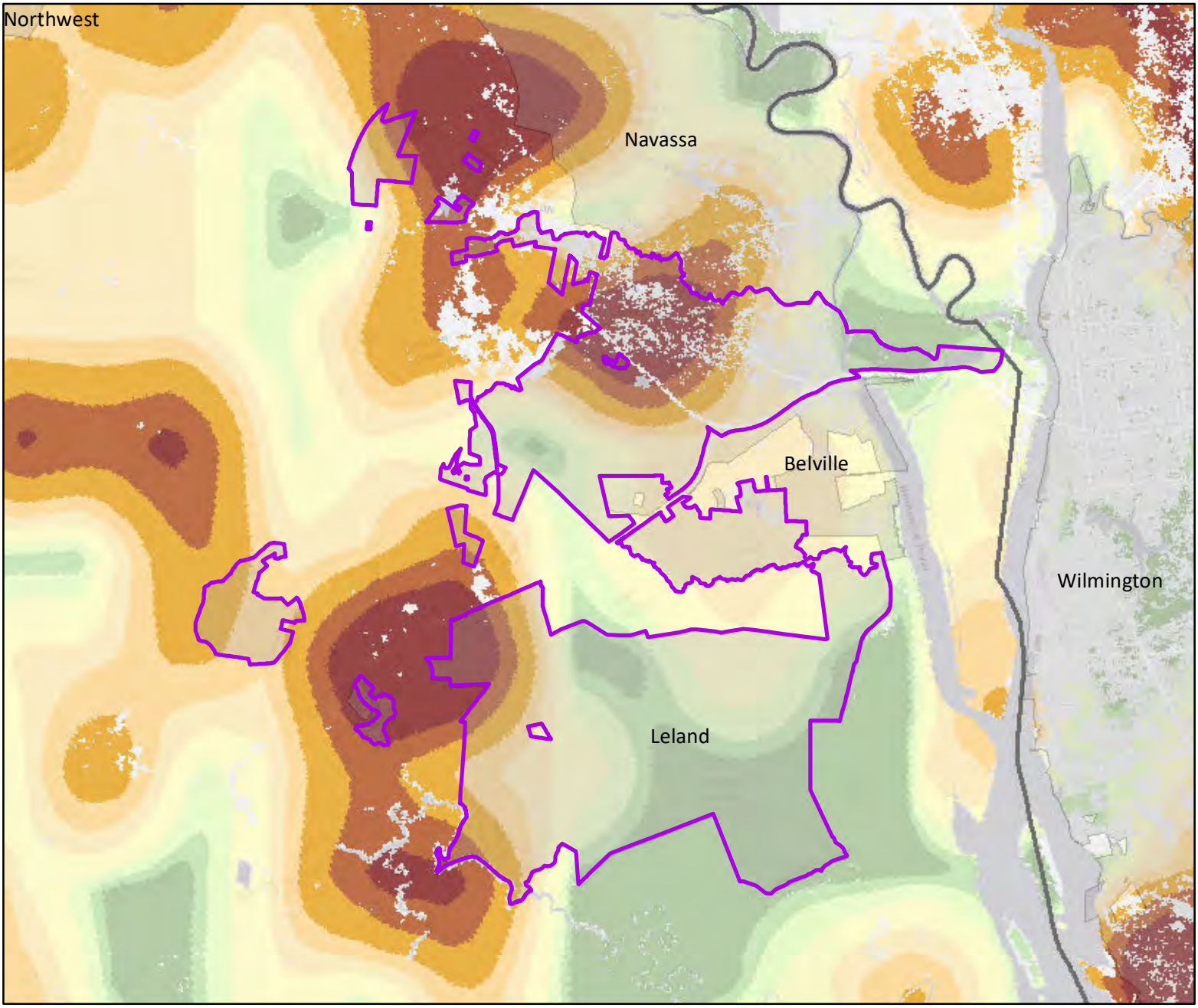
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Leland - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

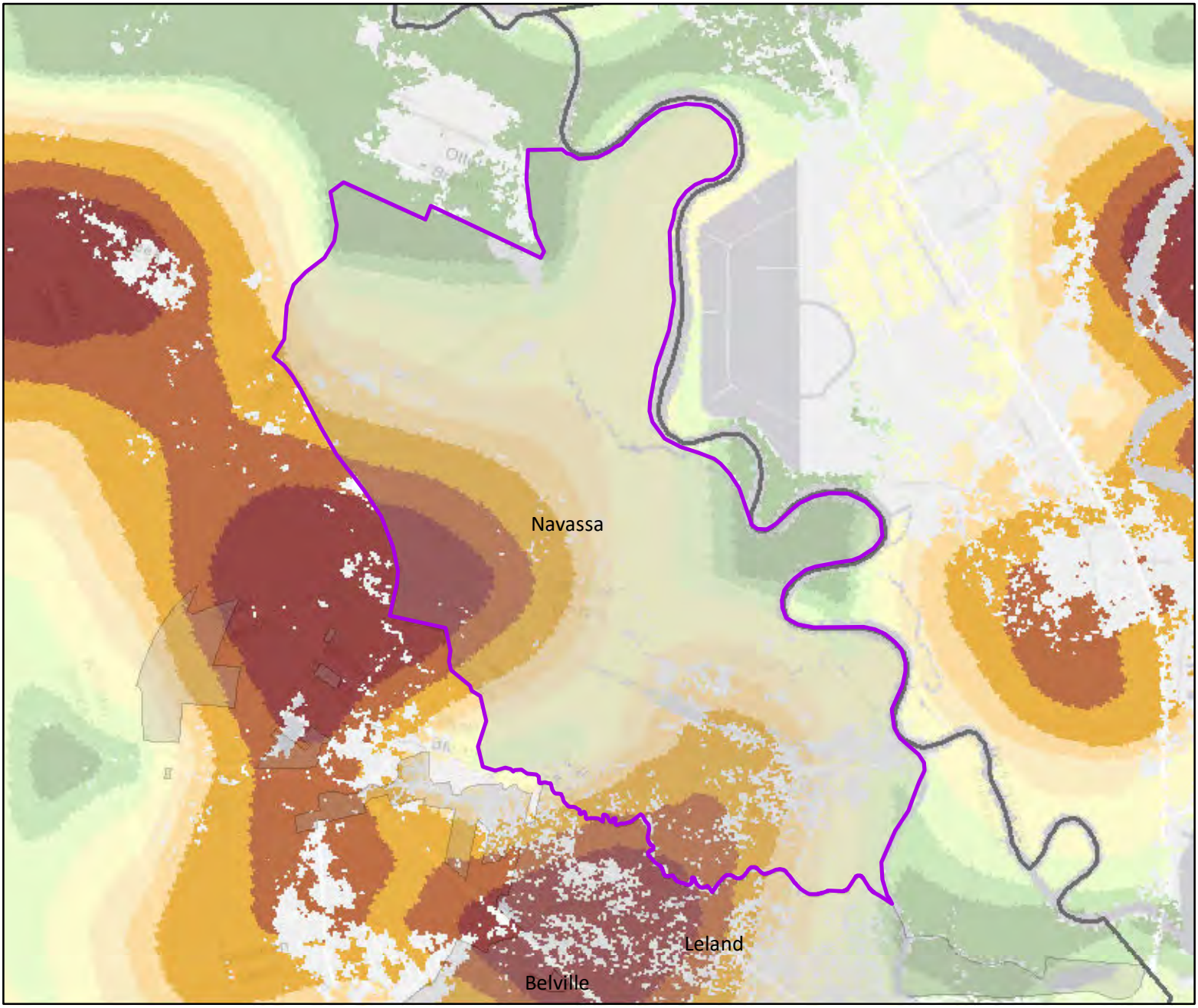
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Navassa - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

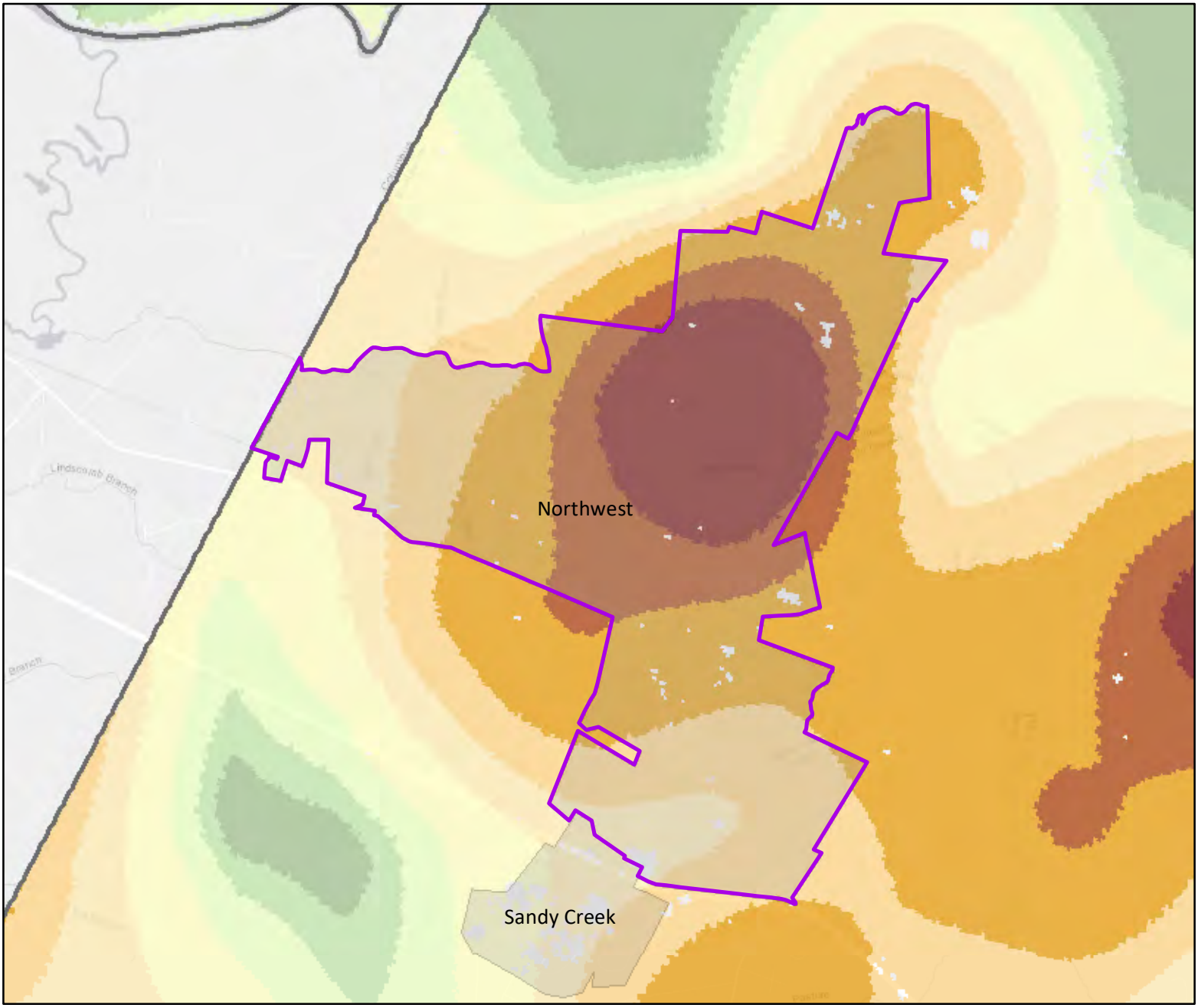
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Northwest - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

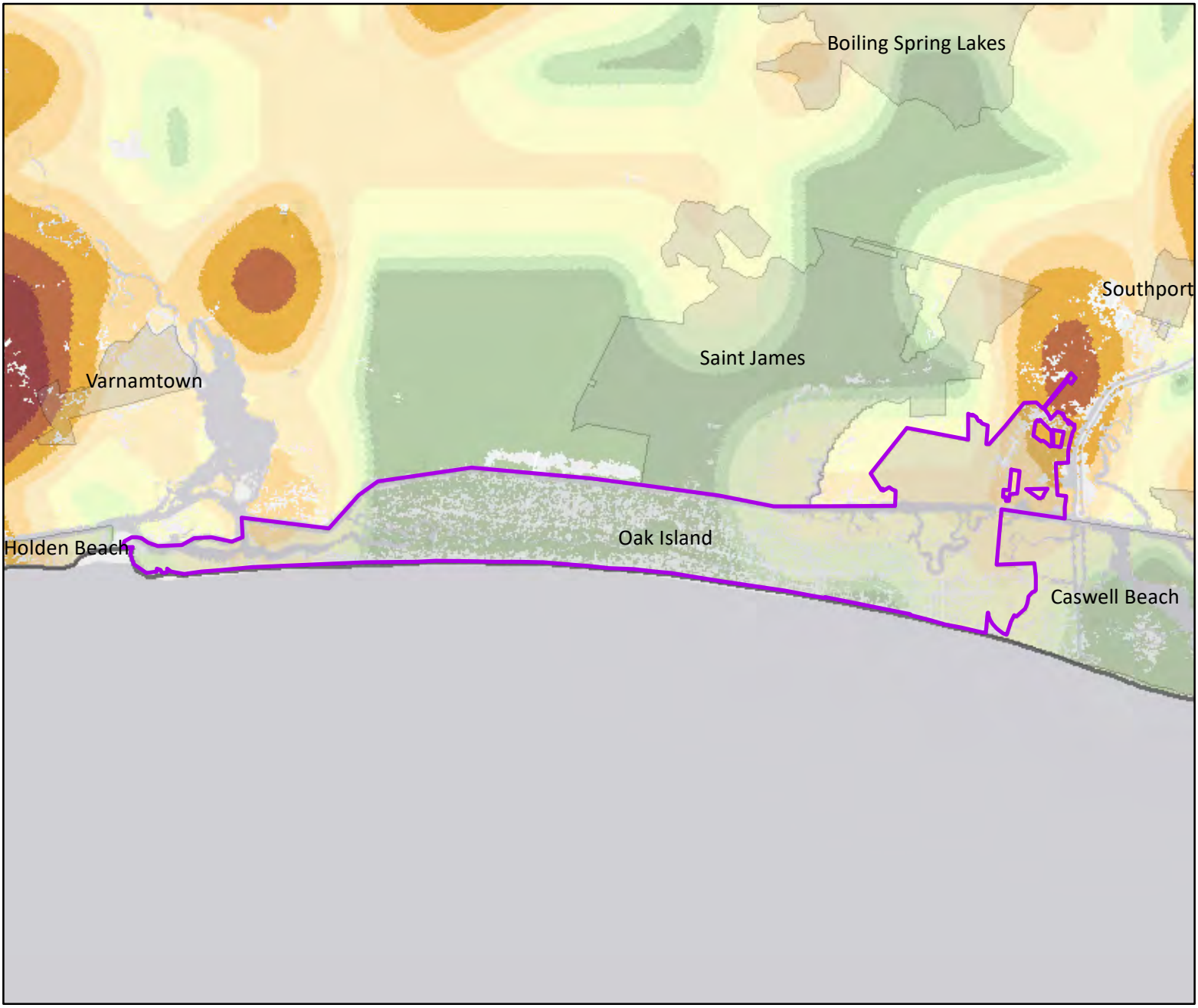
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Oak Island - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

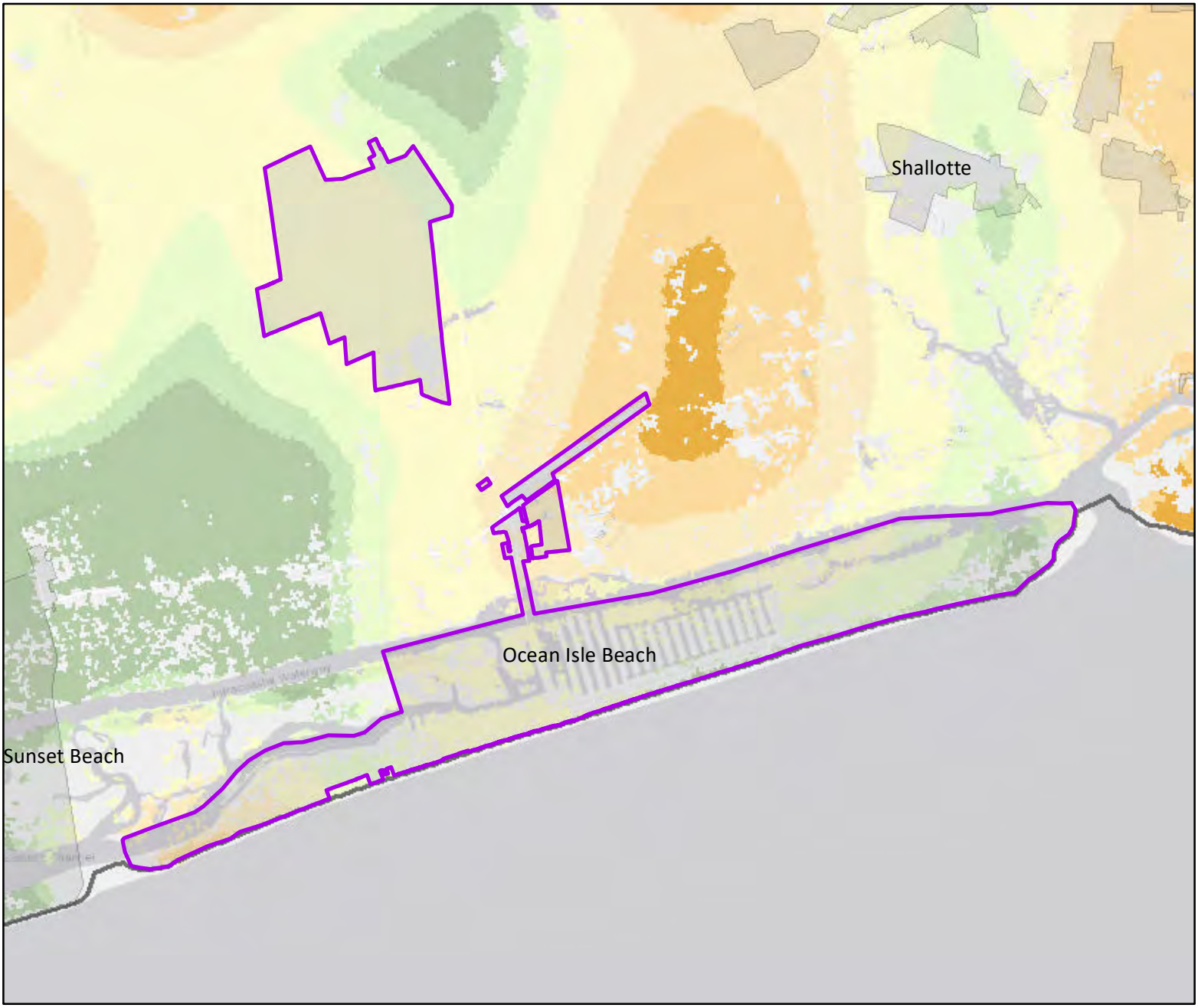
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Ocean Isle Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

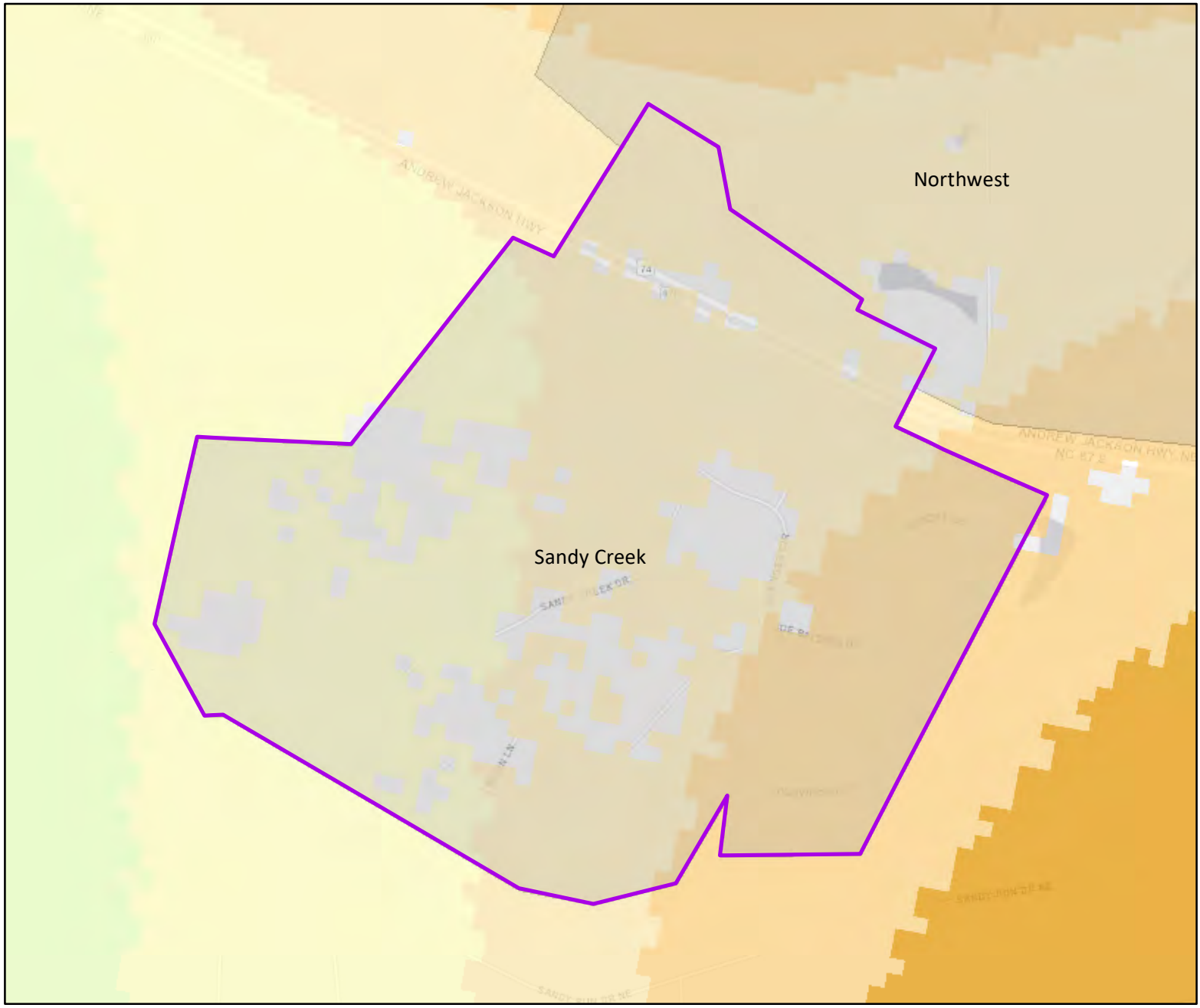
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Sandy Creek - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

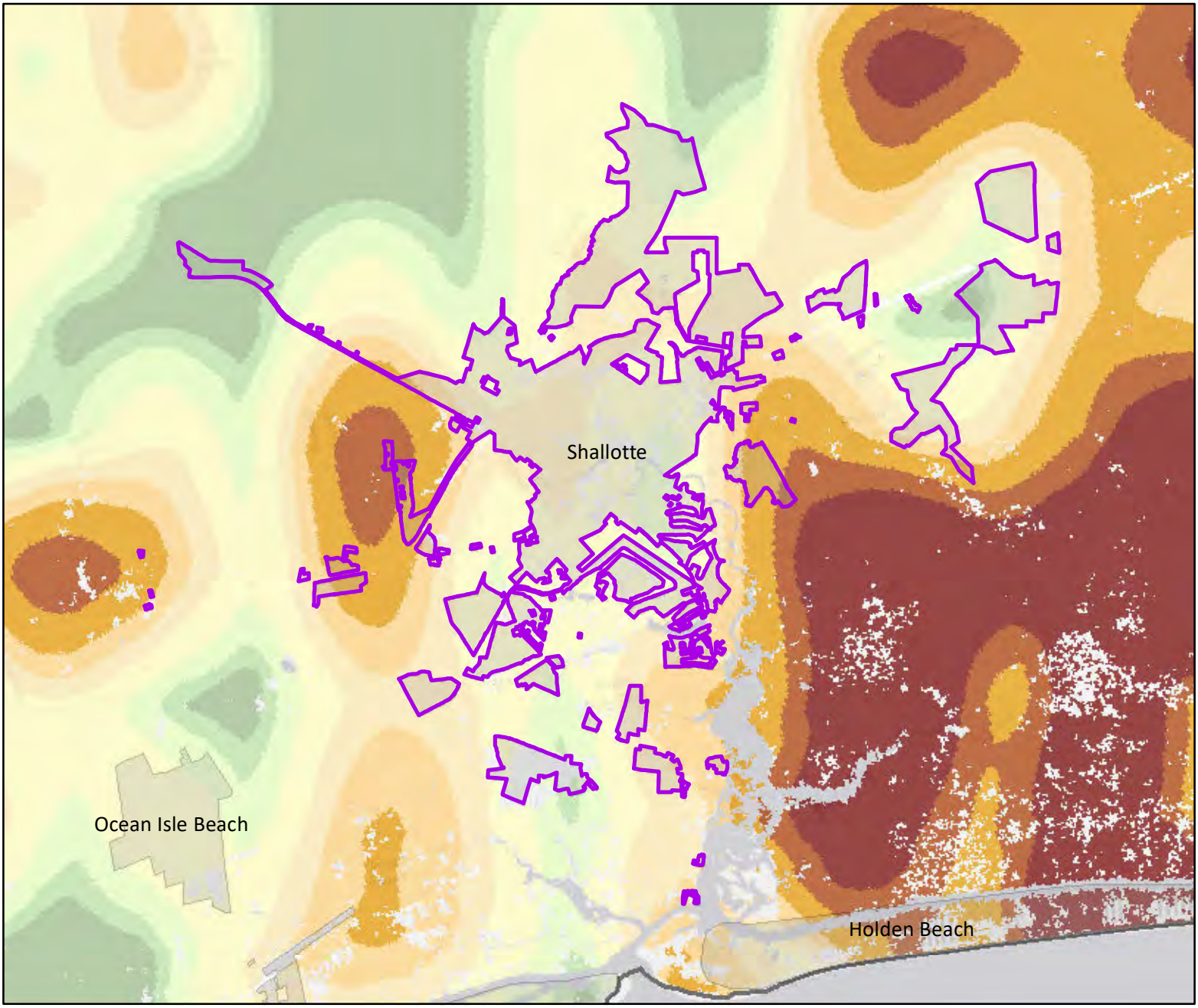
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Shallotte - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

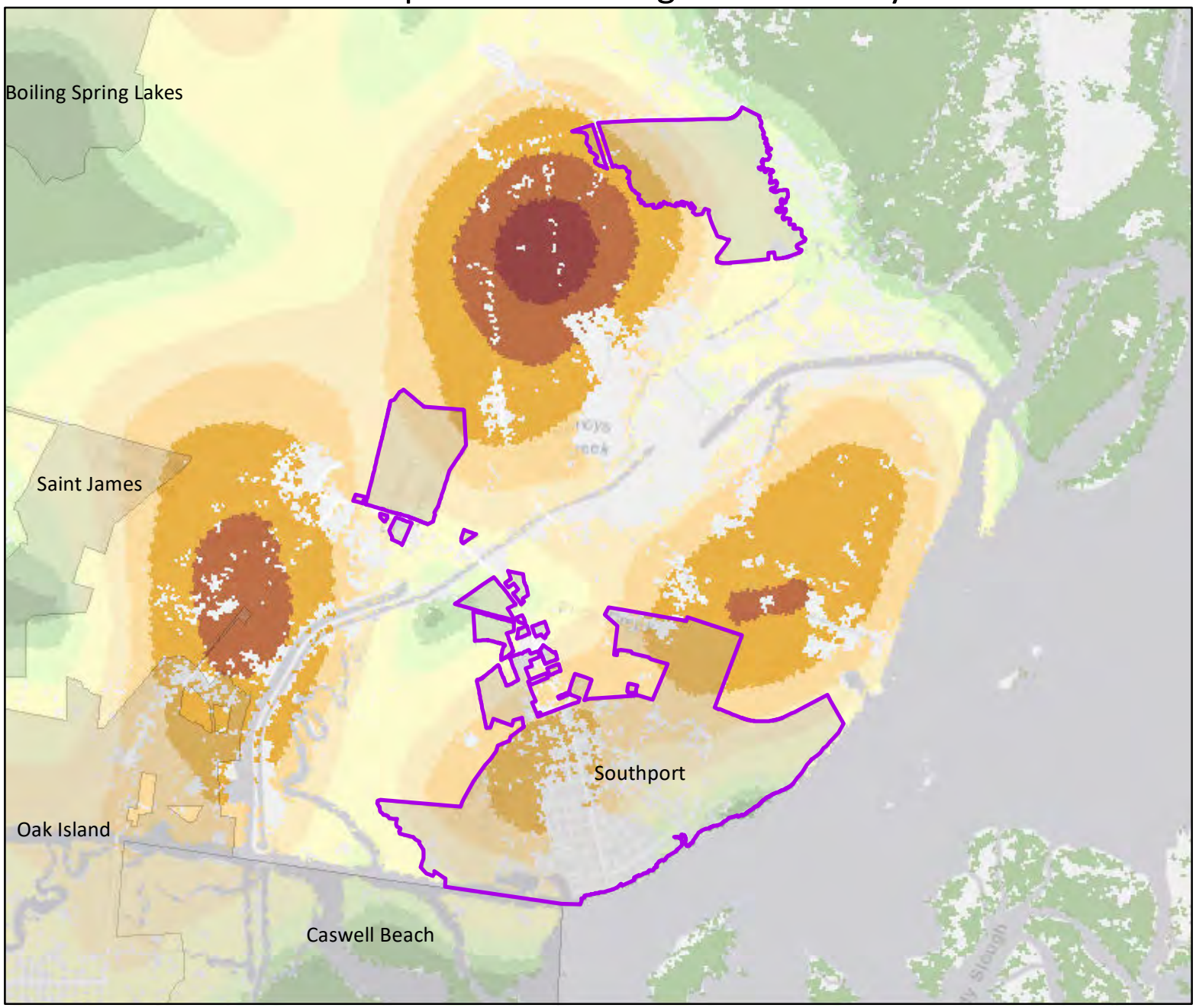
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Southport - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

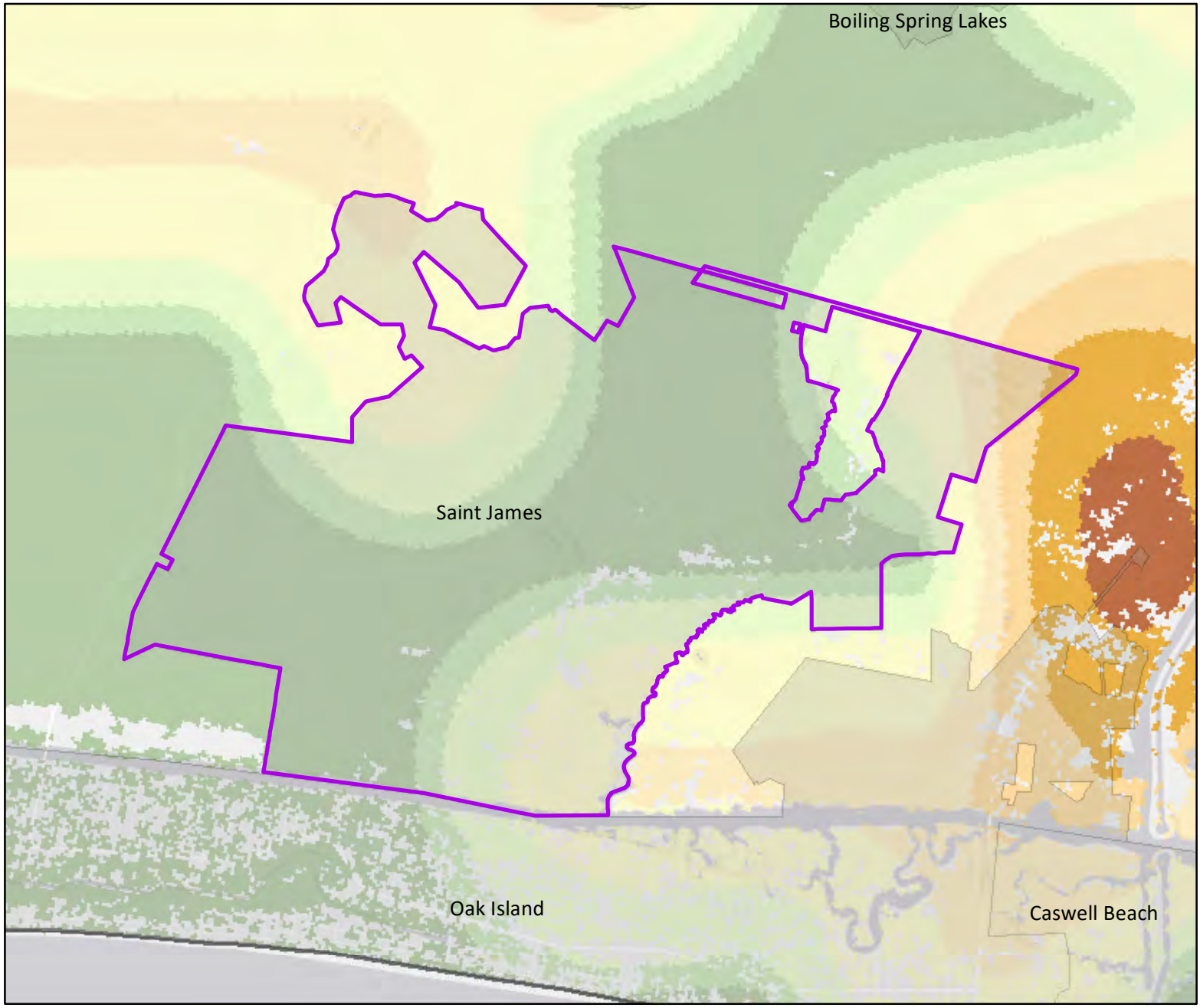
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Saint James - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

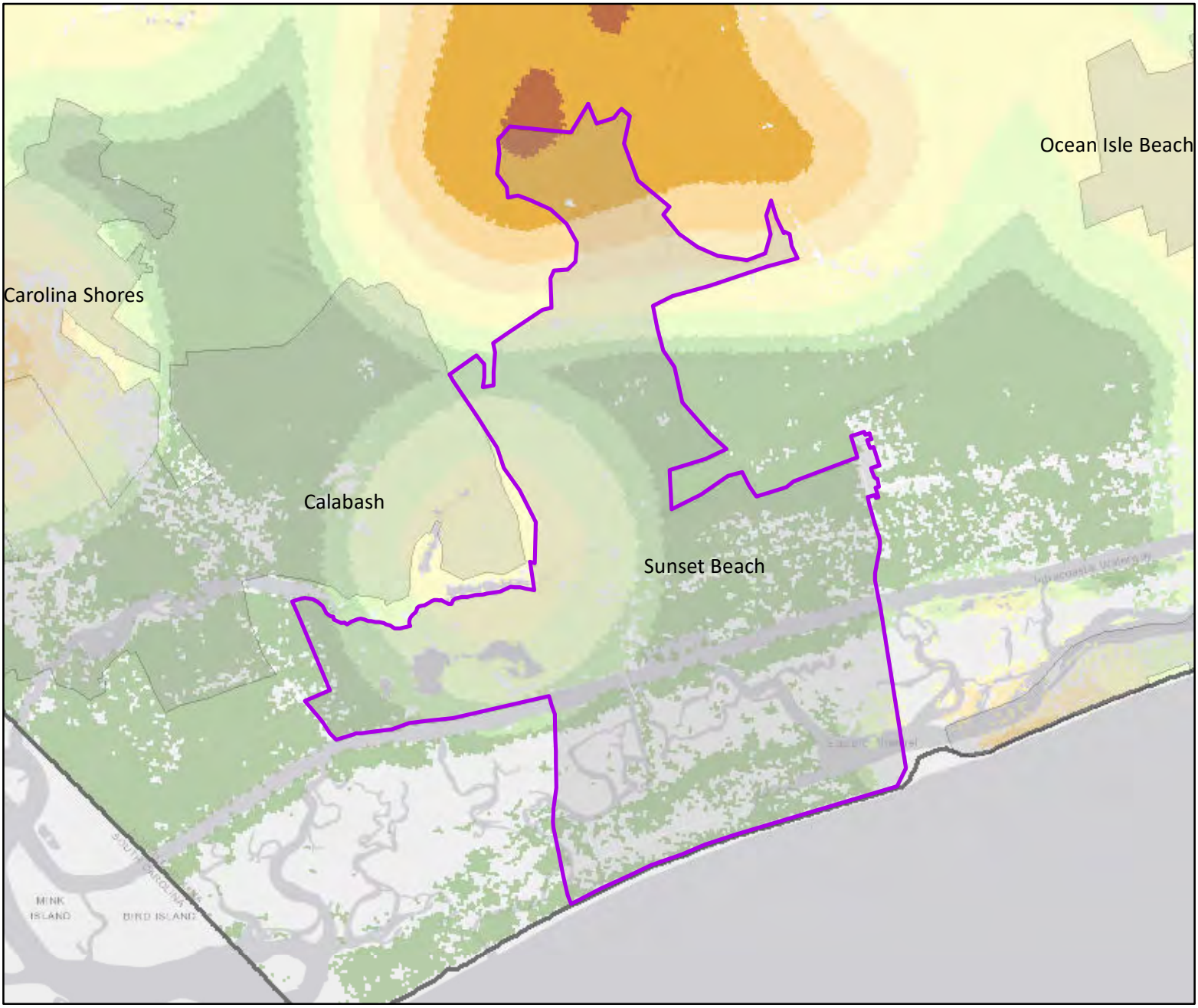
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Sunset Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

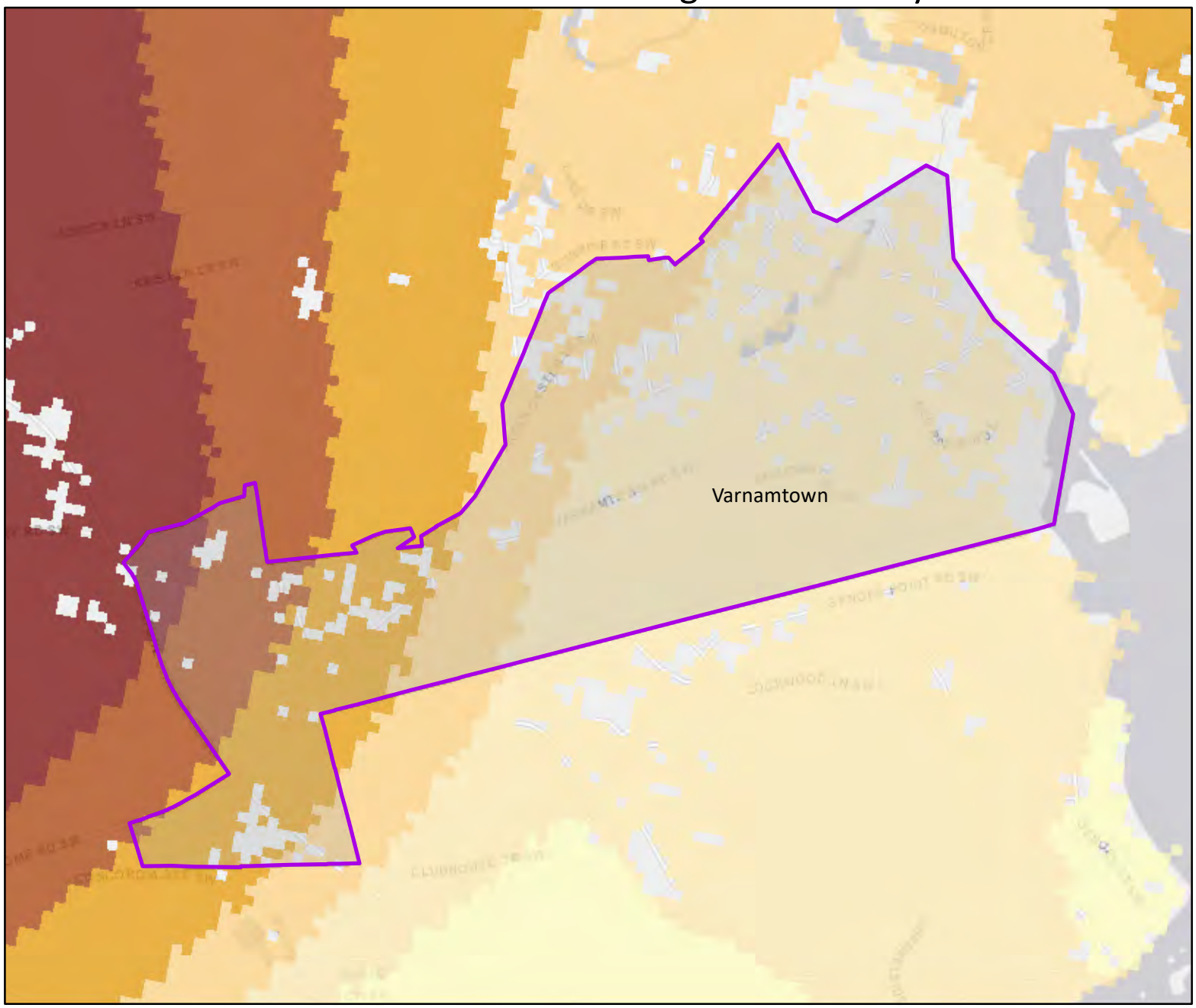
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Varnamtown - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

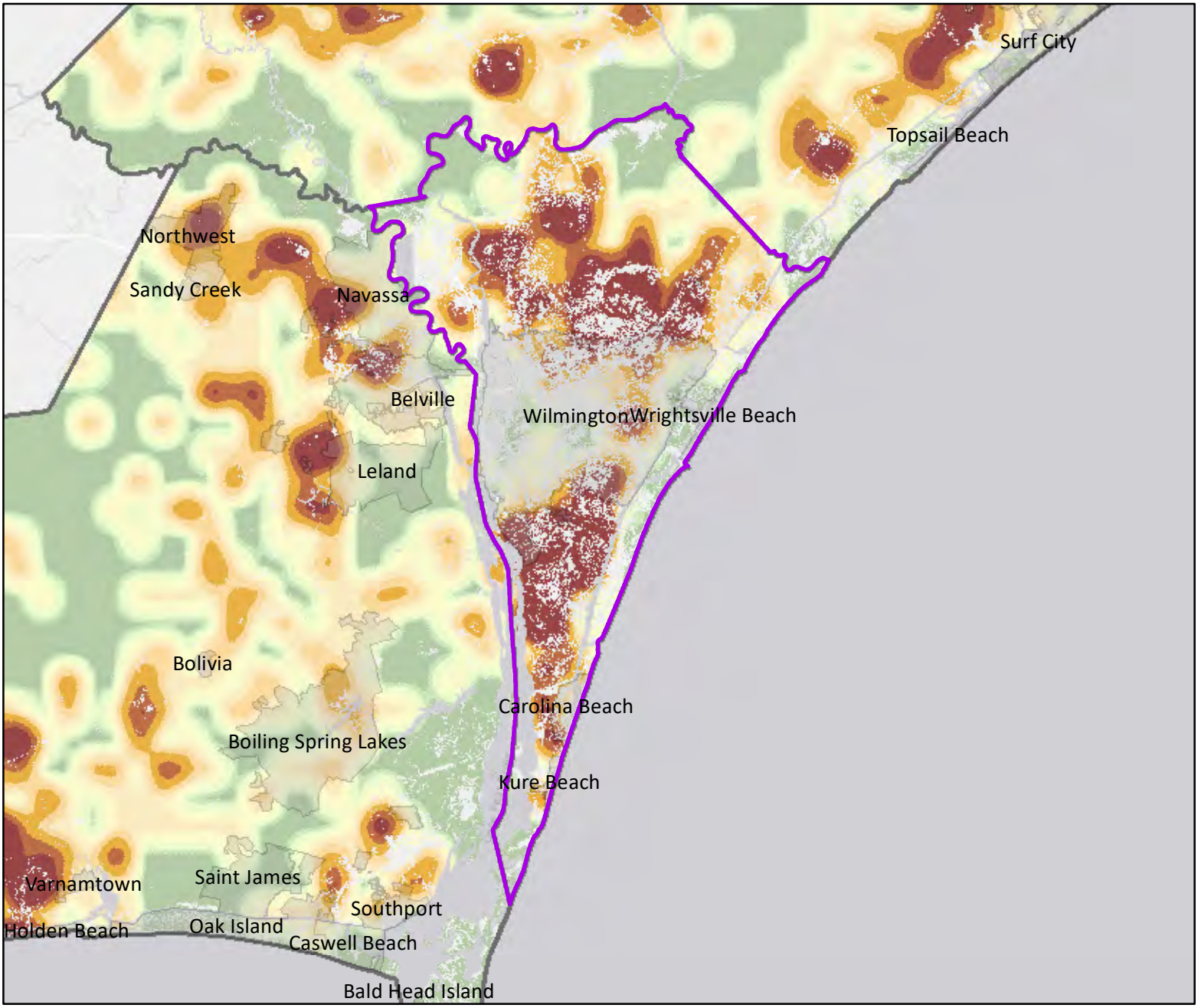
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

New Hanover County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

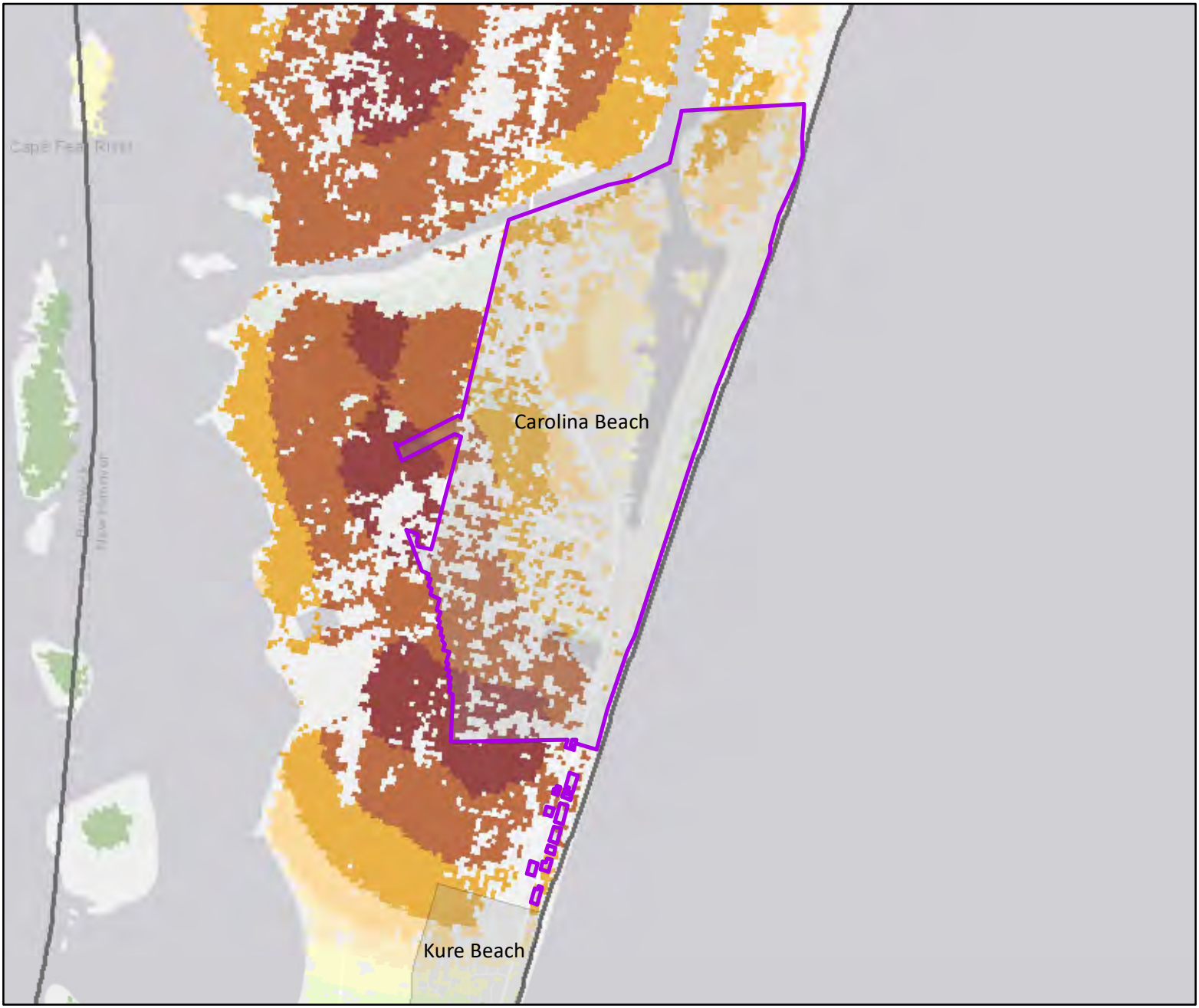
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.5 7 14 Miles

N

Carolina Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

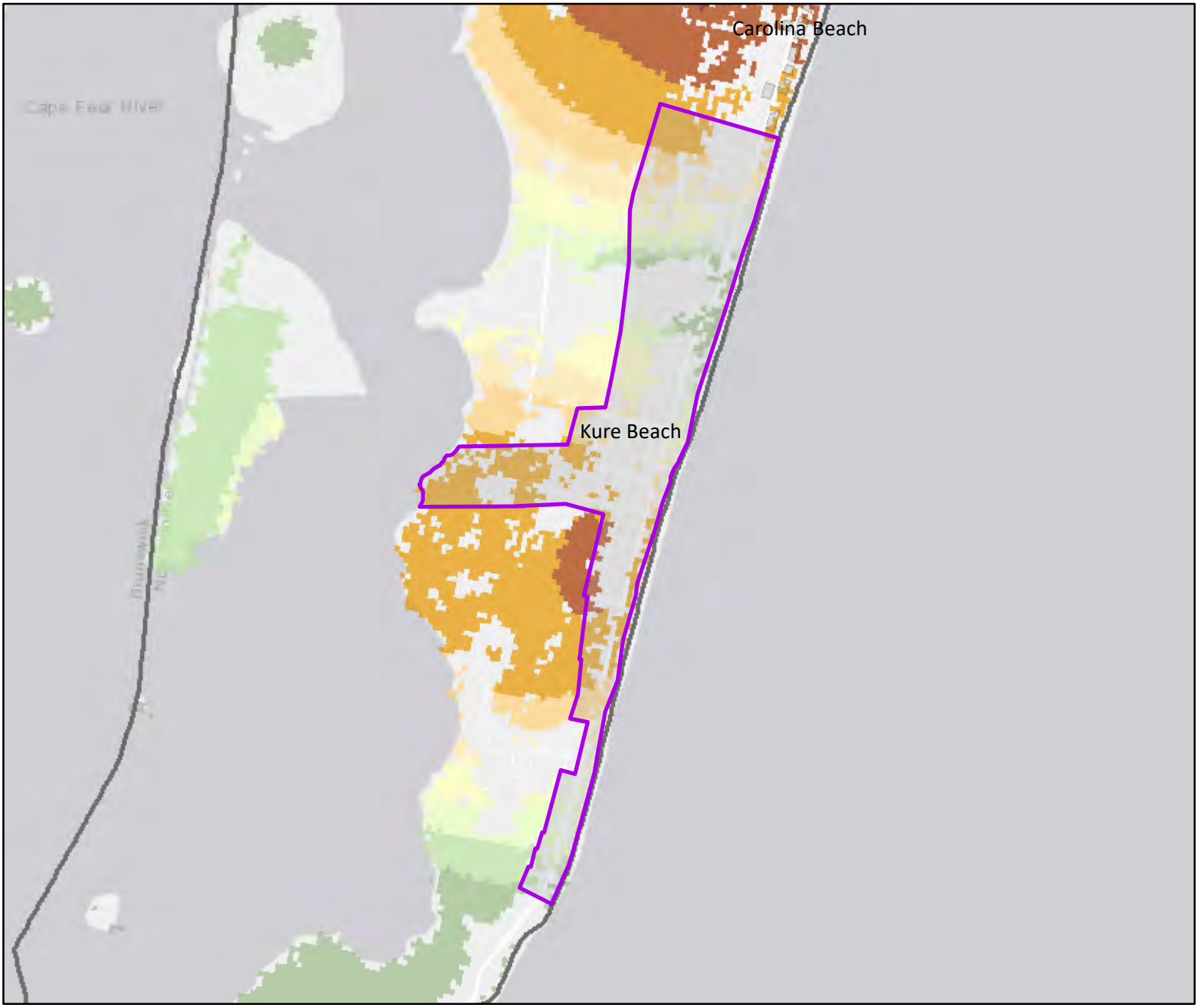
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Kure Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

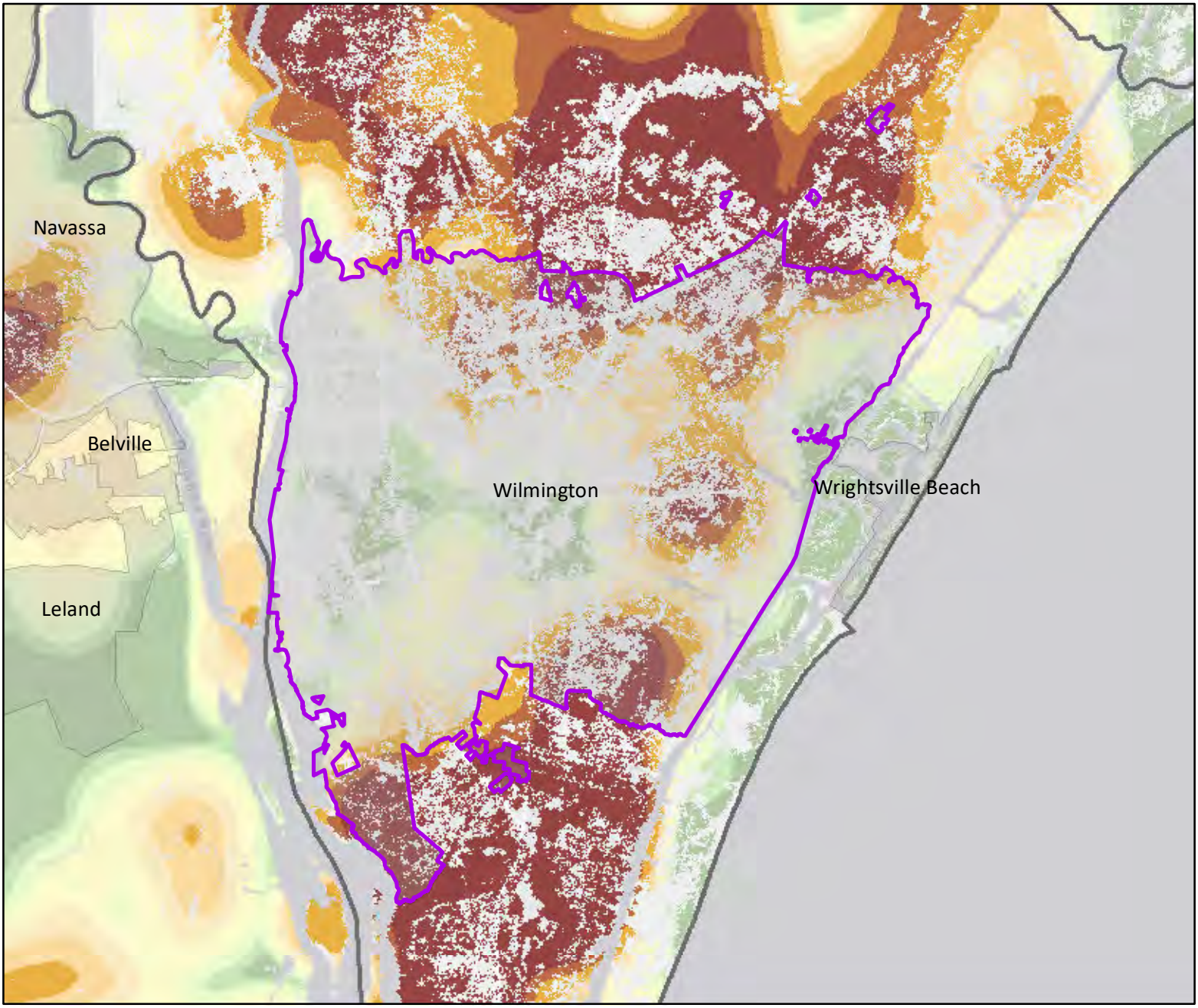
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Wilmington - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 1.25 2.5 5 Miles

N

Wrightsville Beach - Wildfire Ignition Density

Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

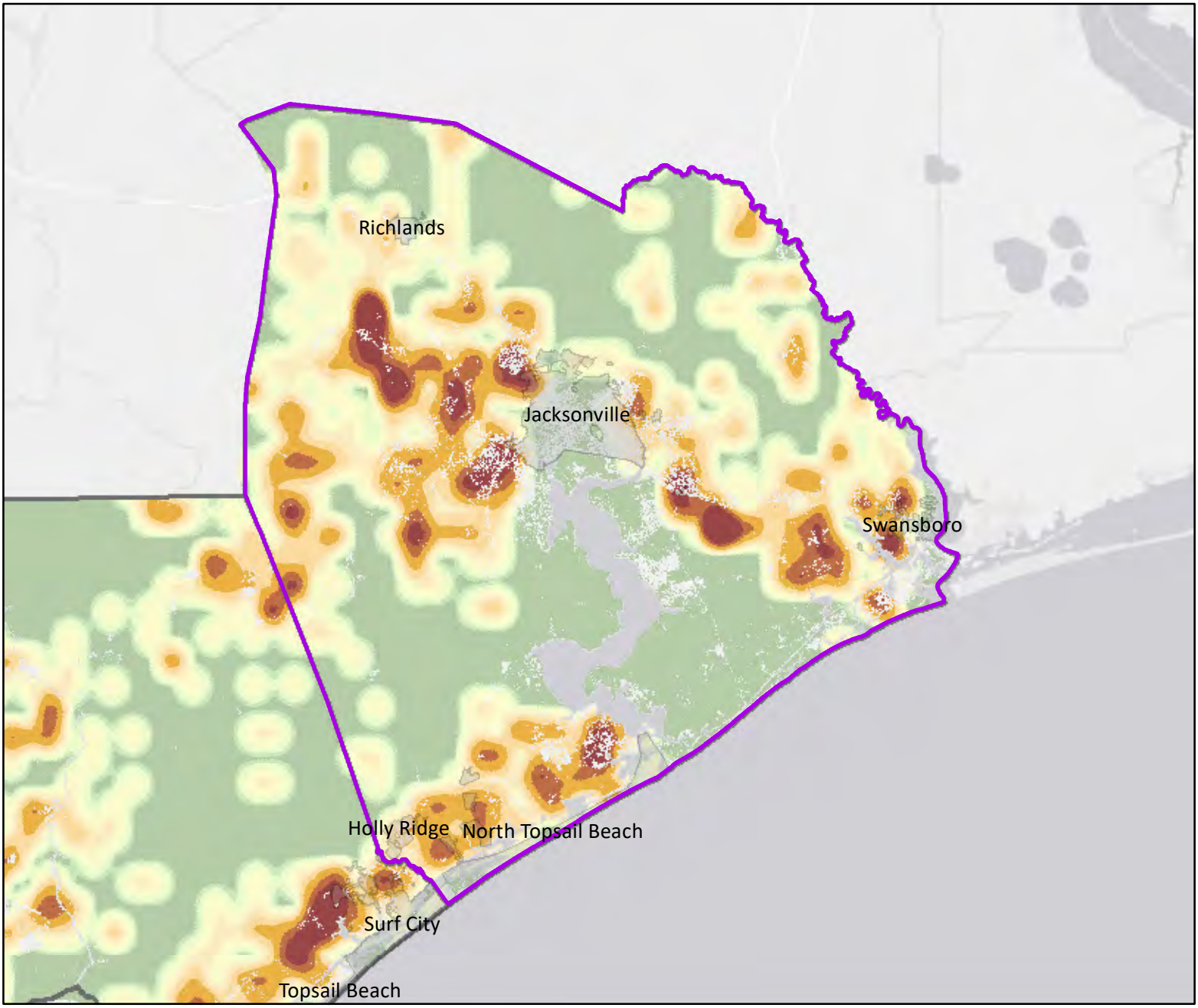
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.4 0.8 1.6 Miles

N

Onslow County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

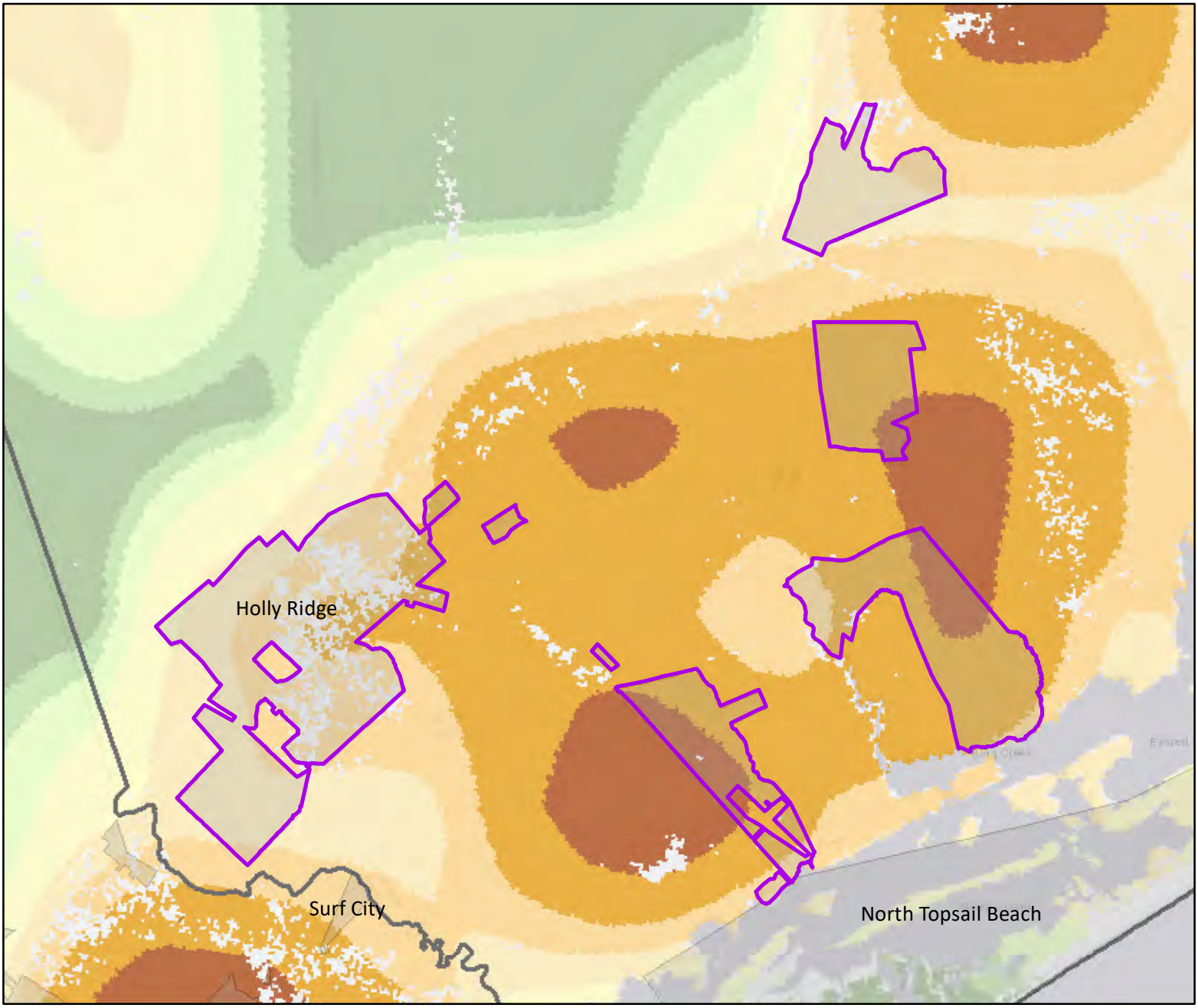
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Holly Ridge - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

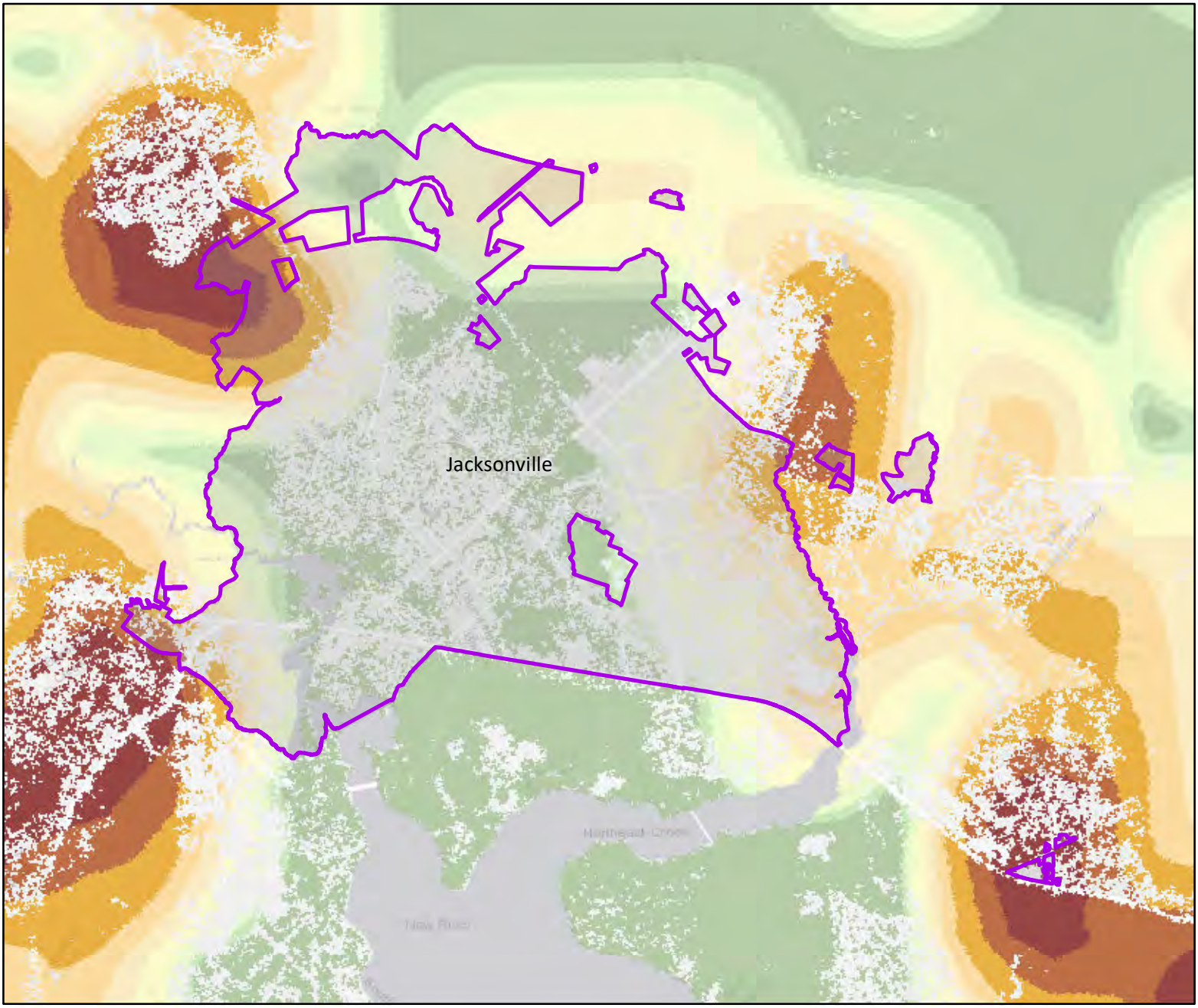
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Jacksonville - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

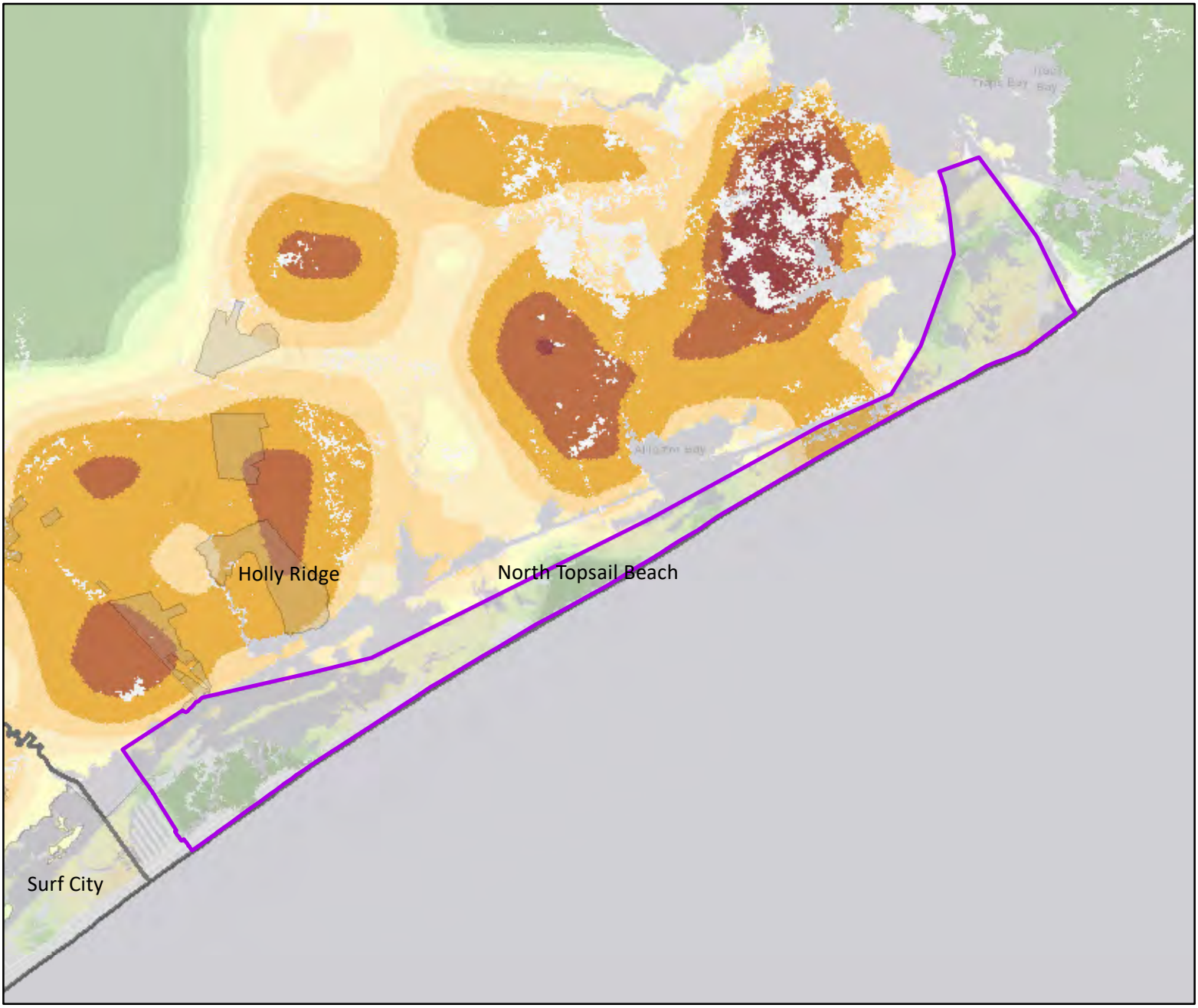
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

North Topsail Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

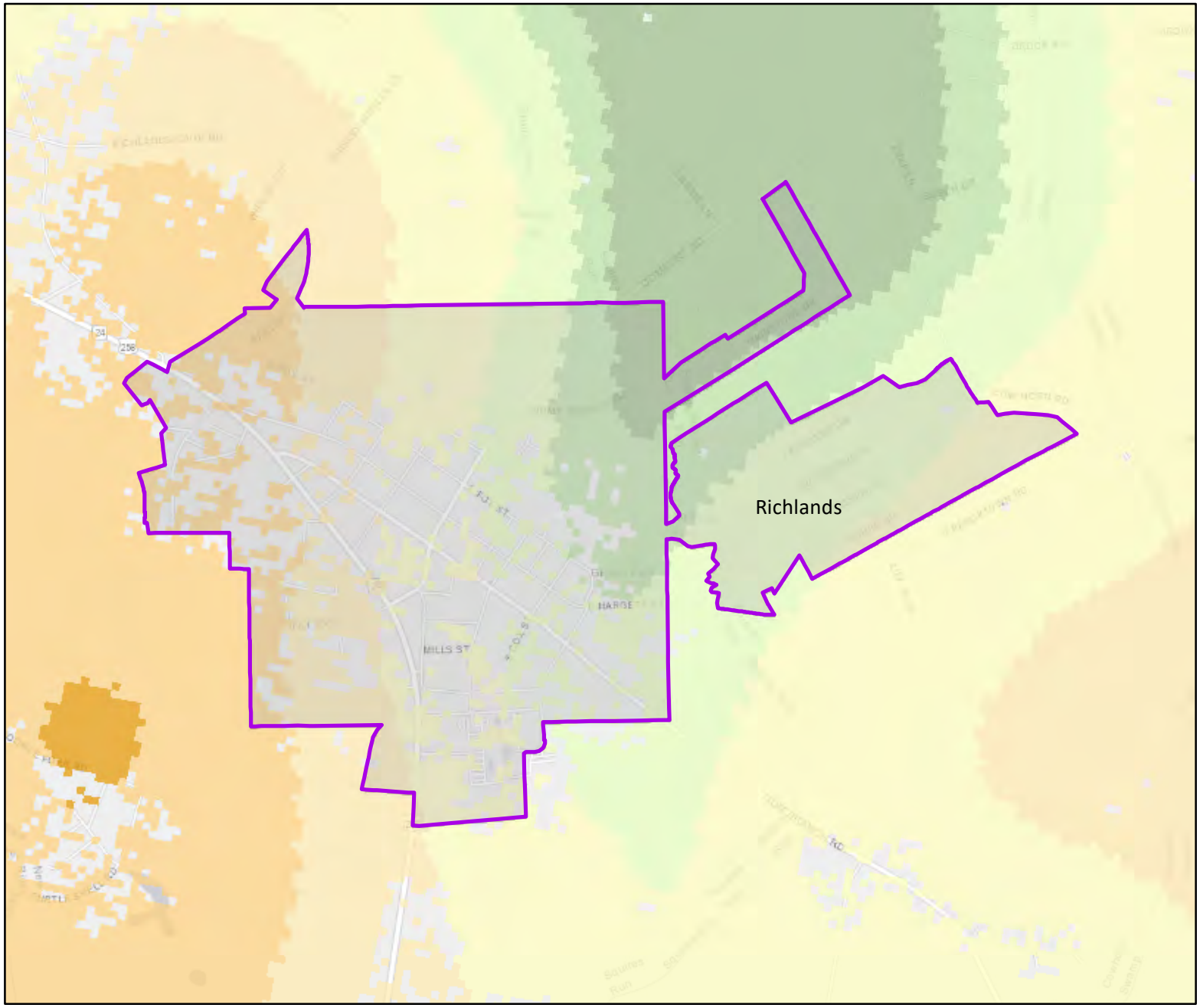
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 1 2 4 Miles

N

Richlands - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

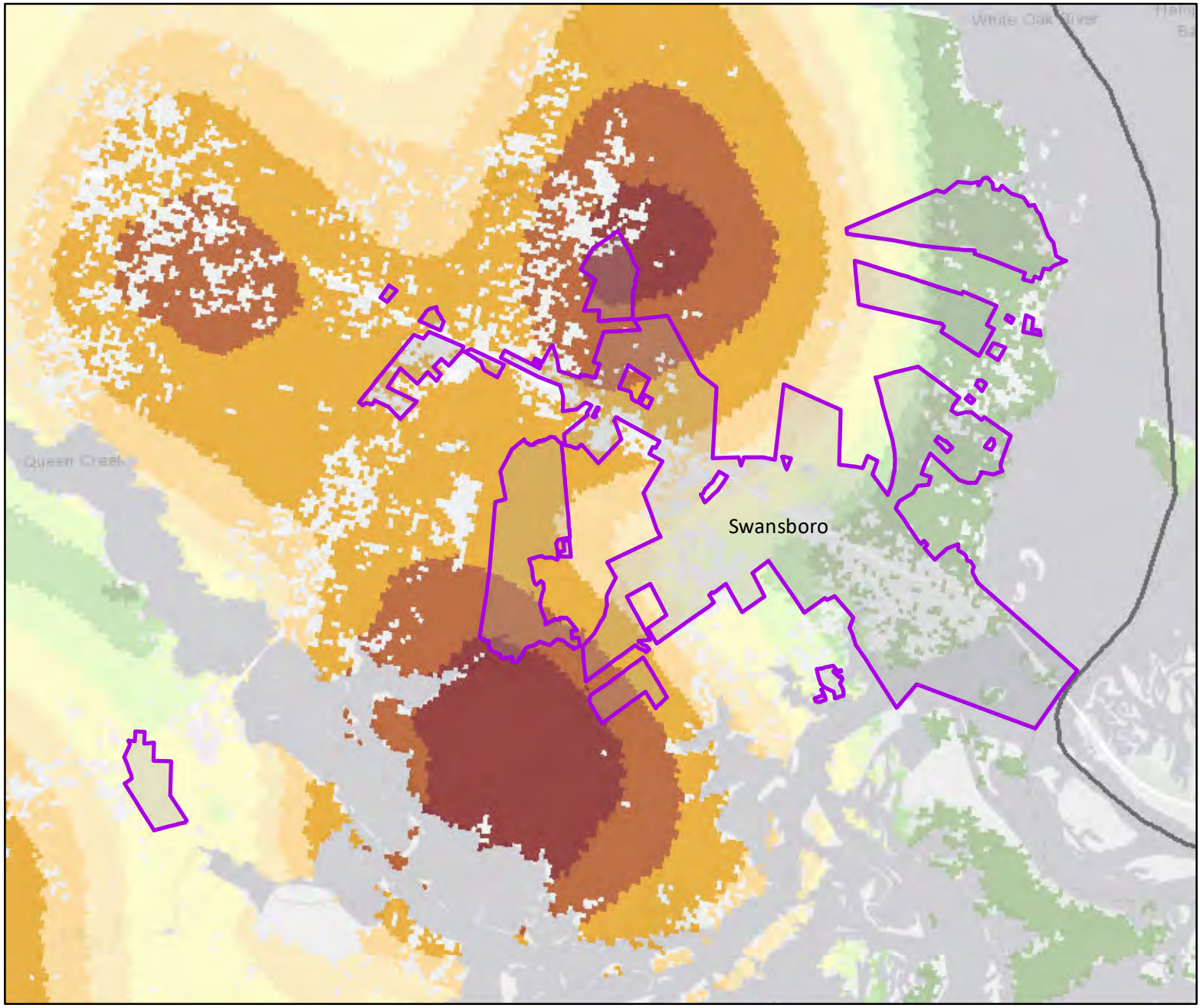
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.2 0.4 0.8 Miles

N

Swansboro - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

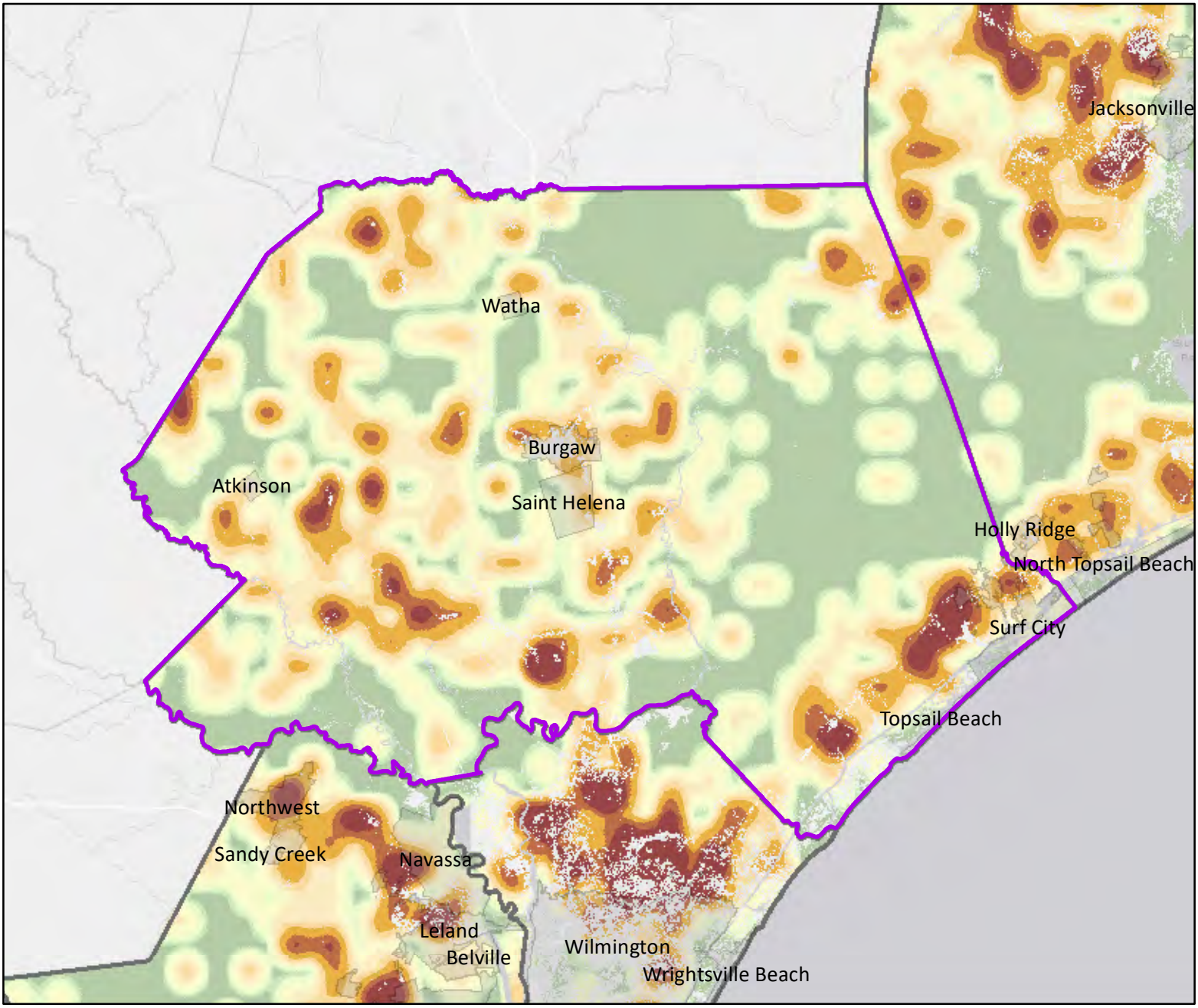
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Pender County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

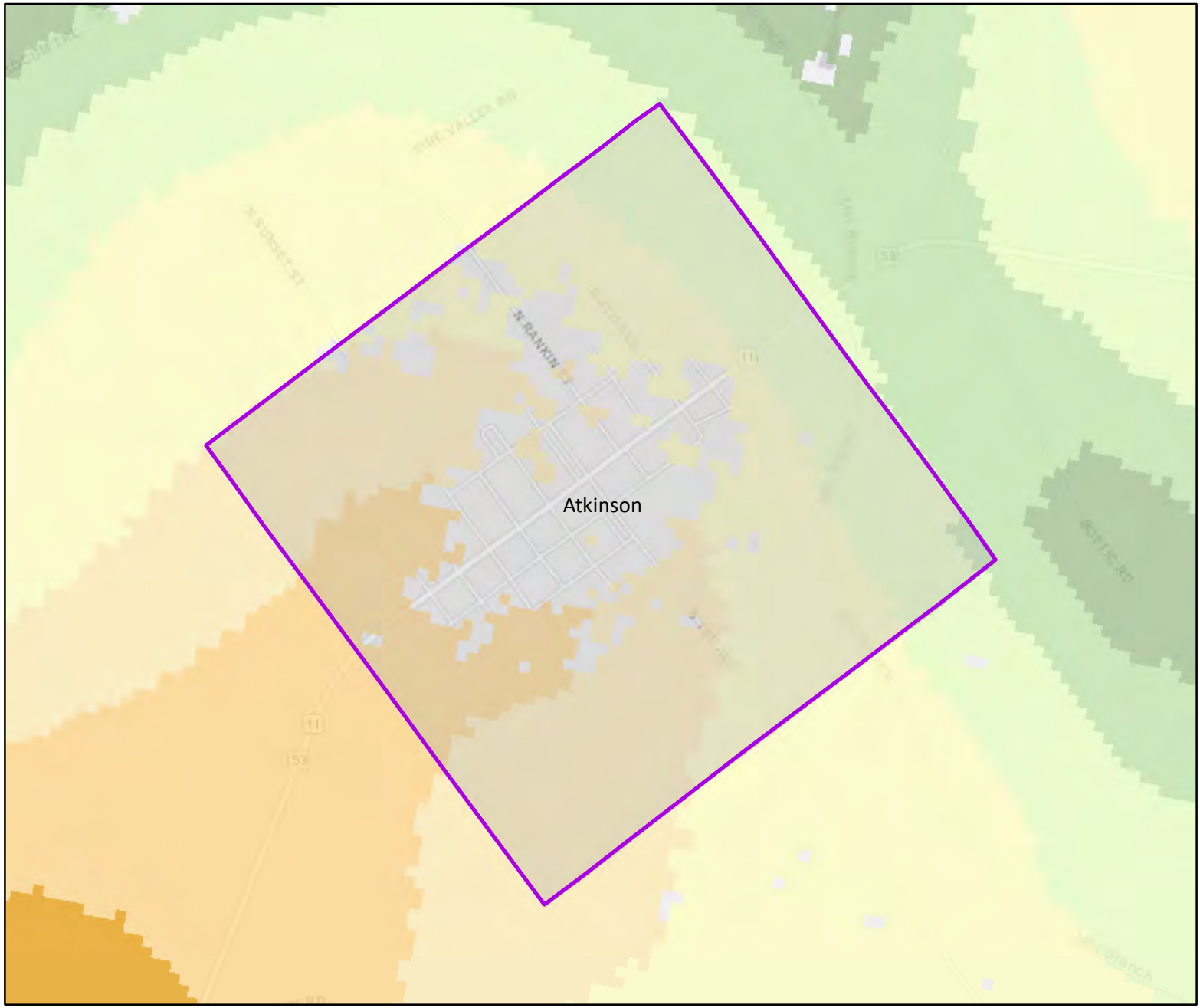
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Atkinson - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

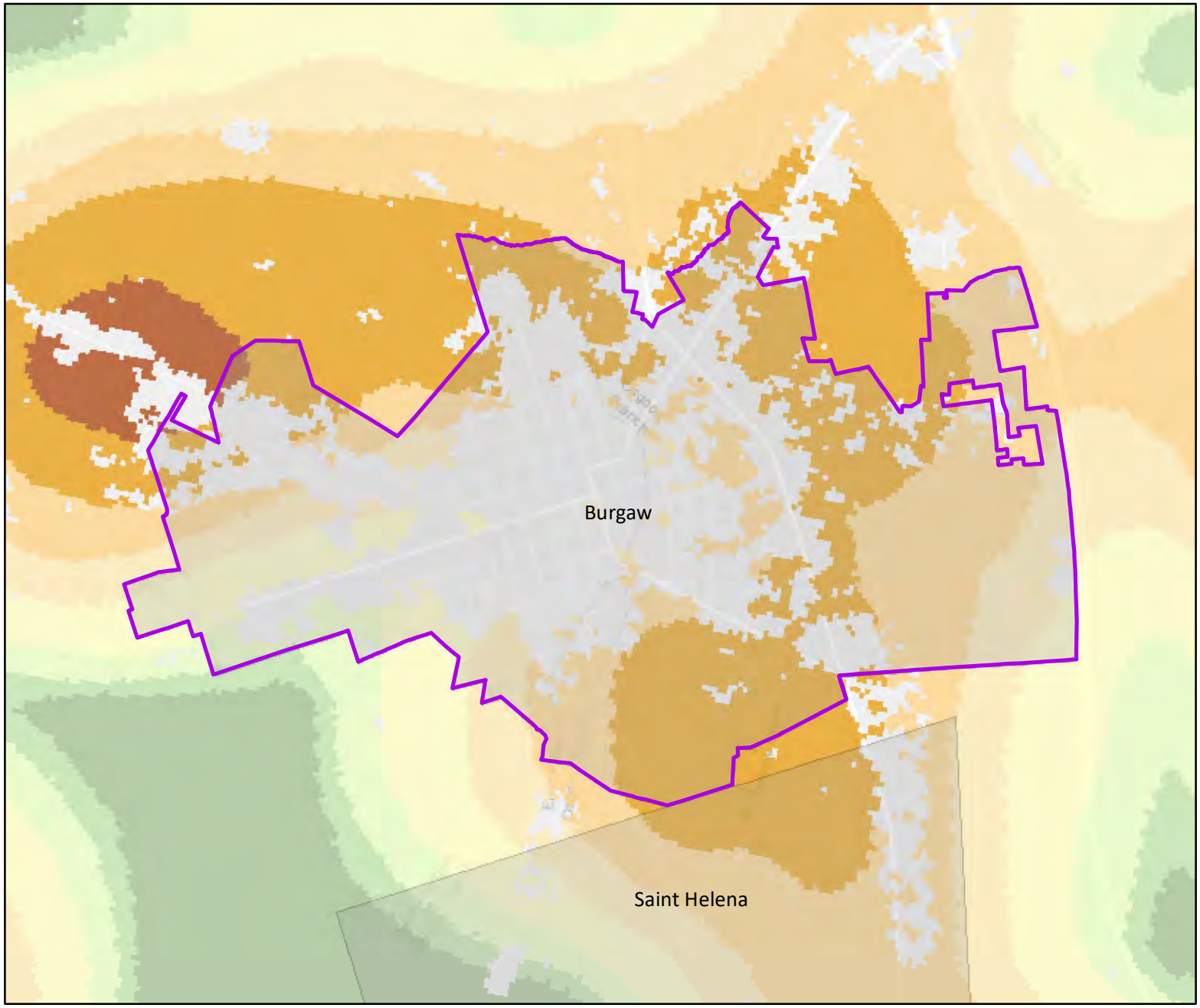
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

Burgaw - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

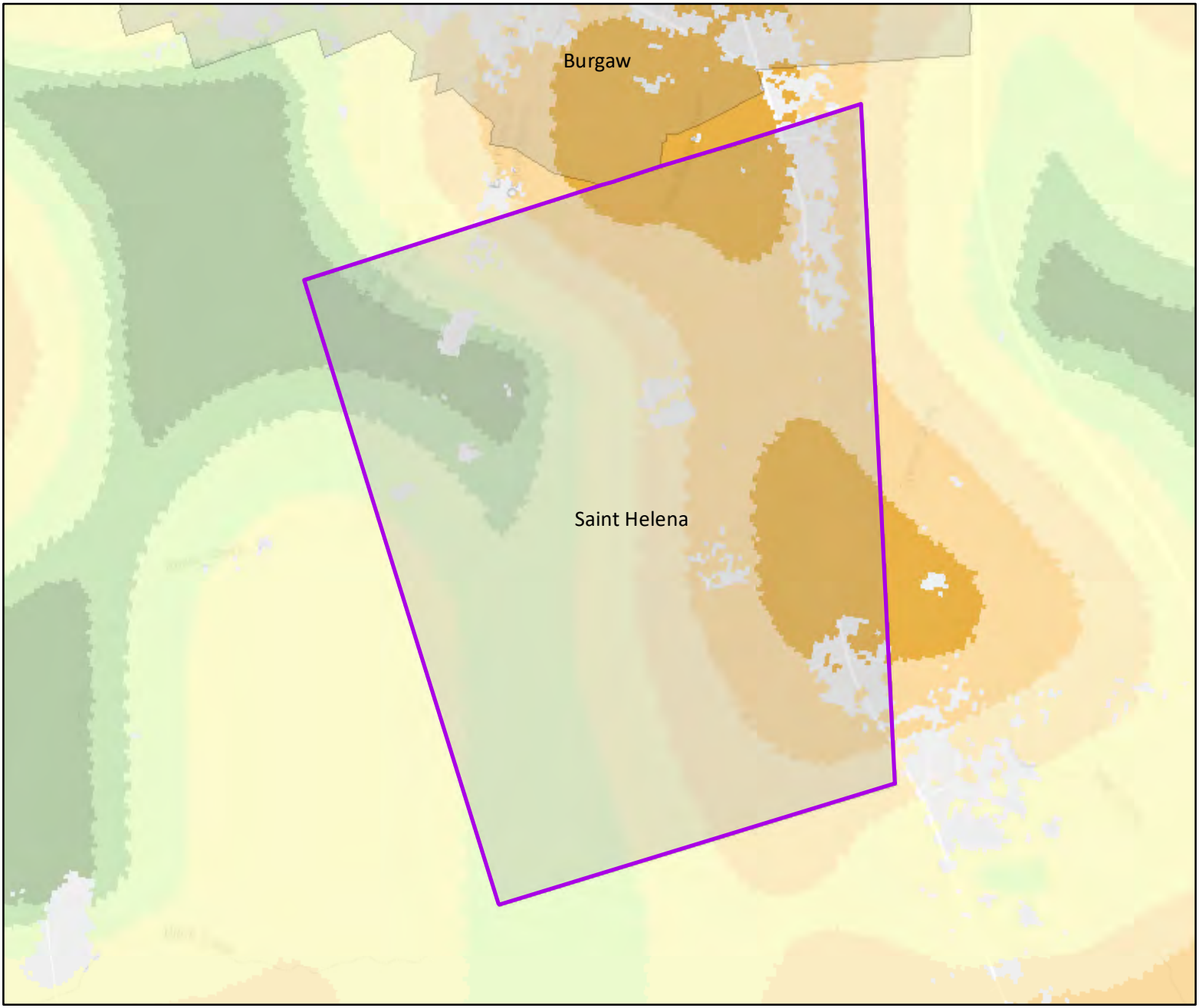
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.325 0.65 1.3 Miles

N

Saint Helena - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

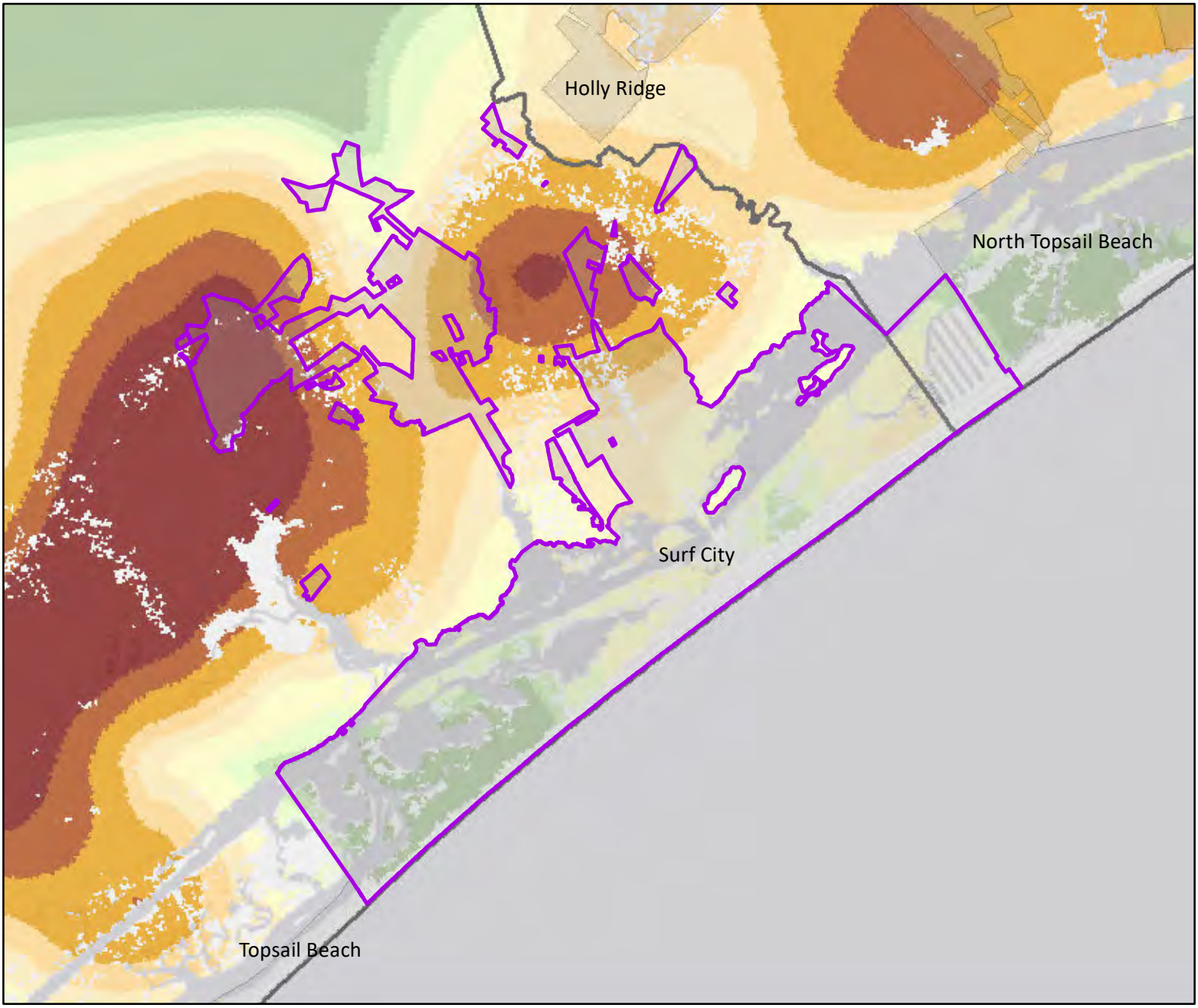
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Surf City - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

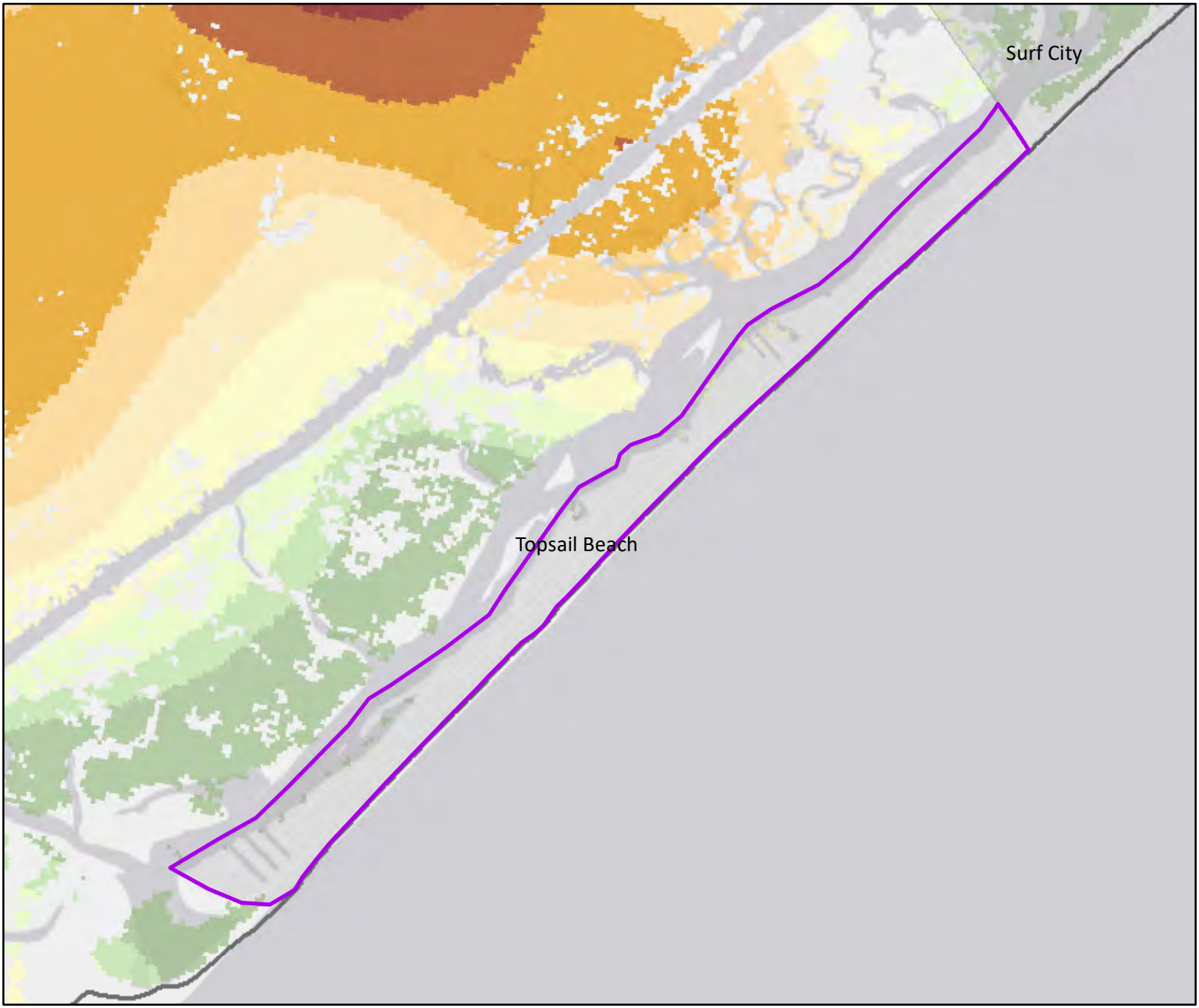
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Topsail Beach - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

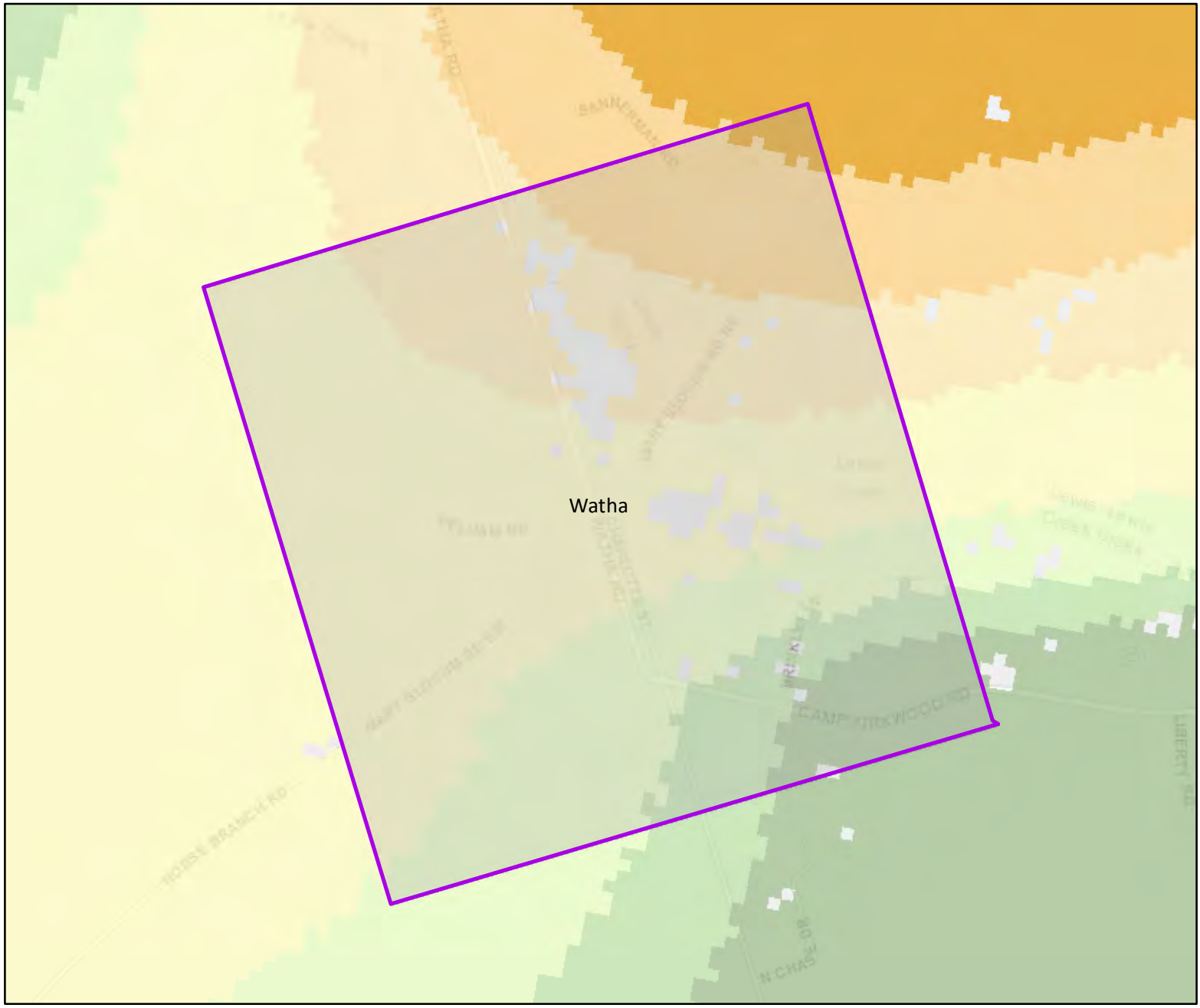
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Watha - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

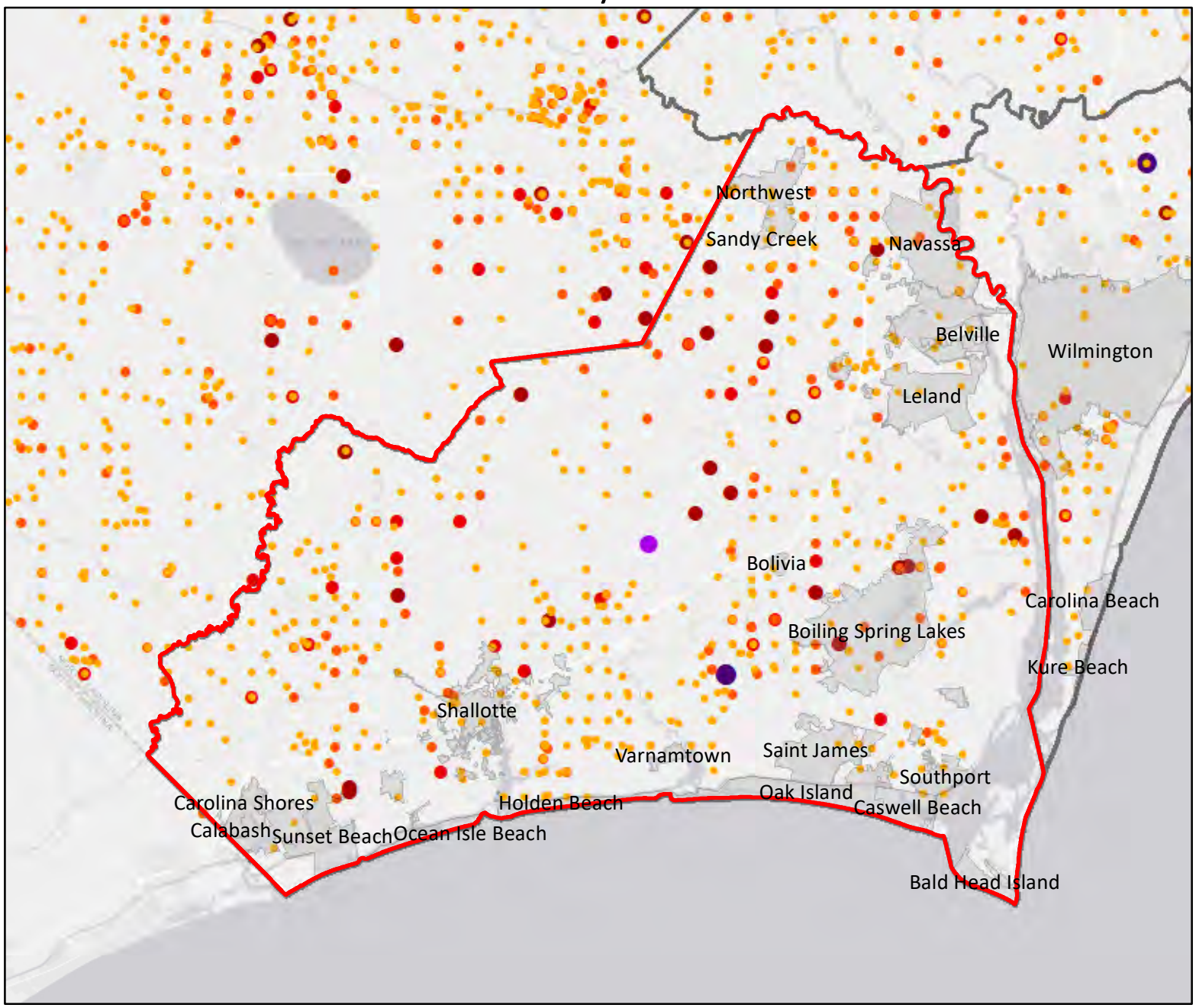
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Brunswick County - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

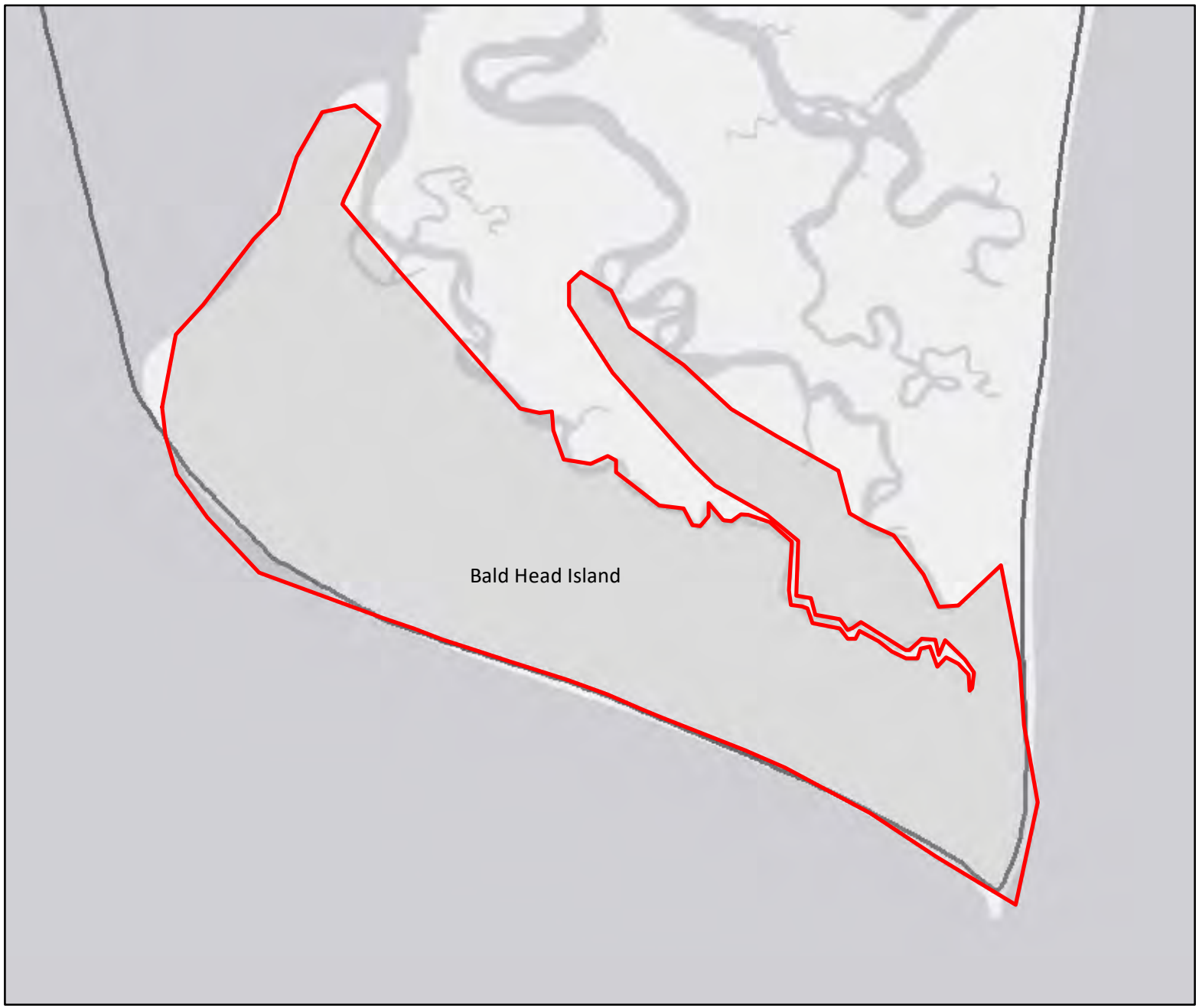
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Bald Head Island - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

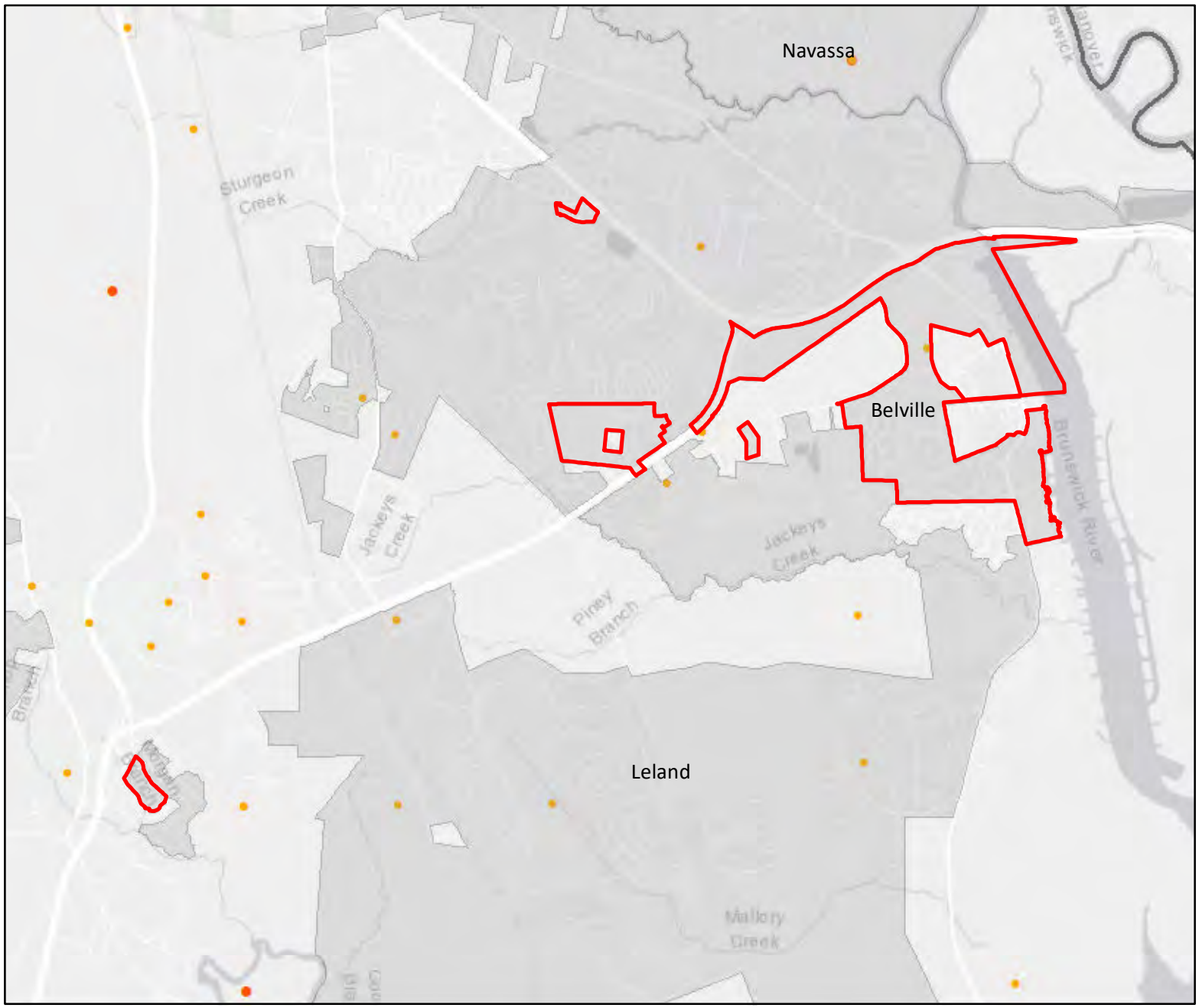
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Belville - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

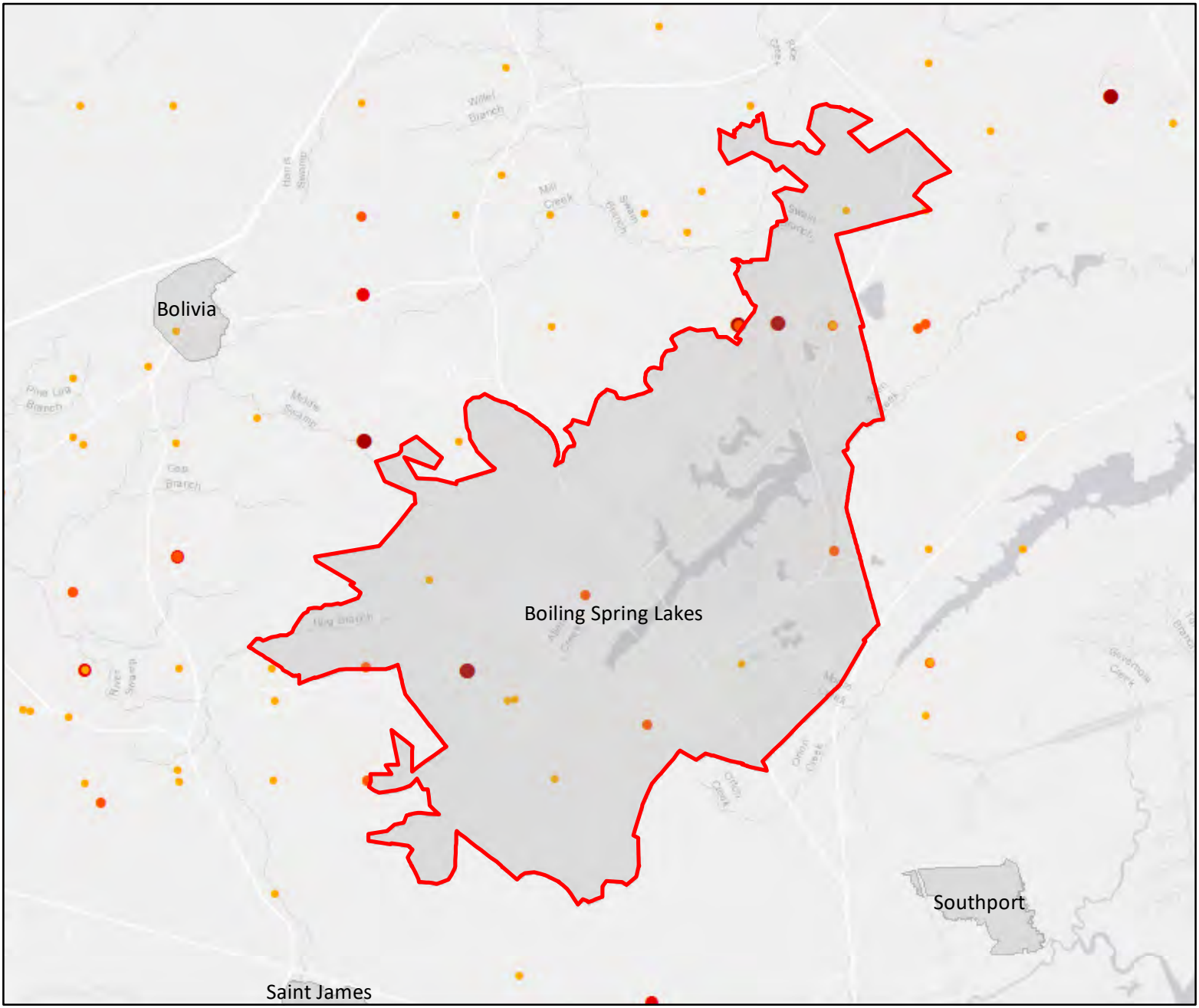
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Boiling Spring Lakes - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Bolivia - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

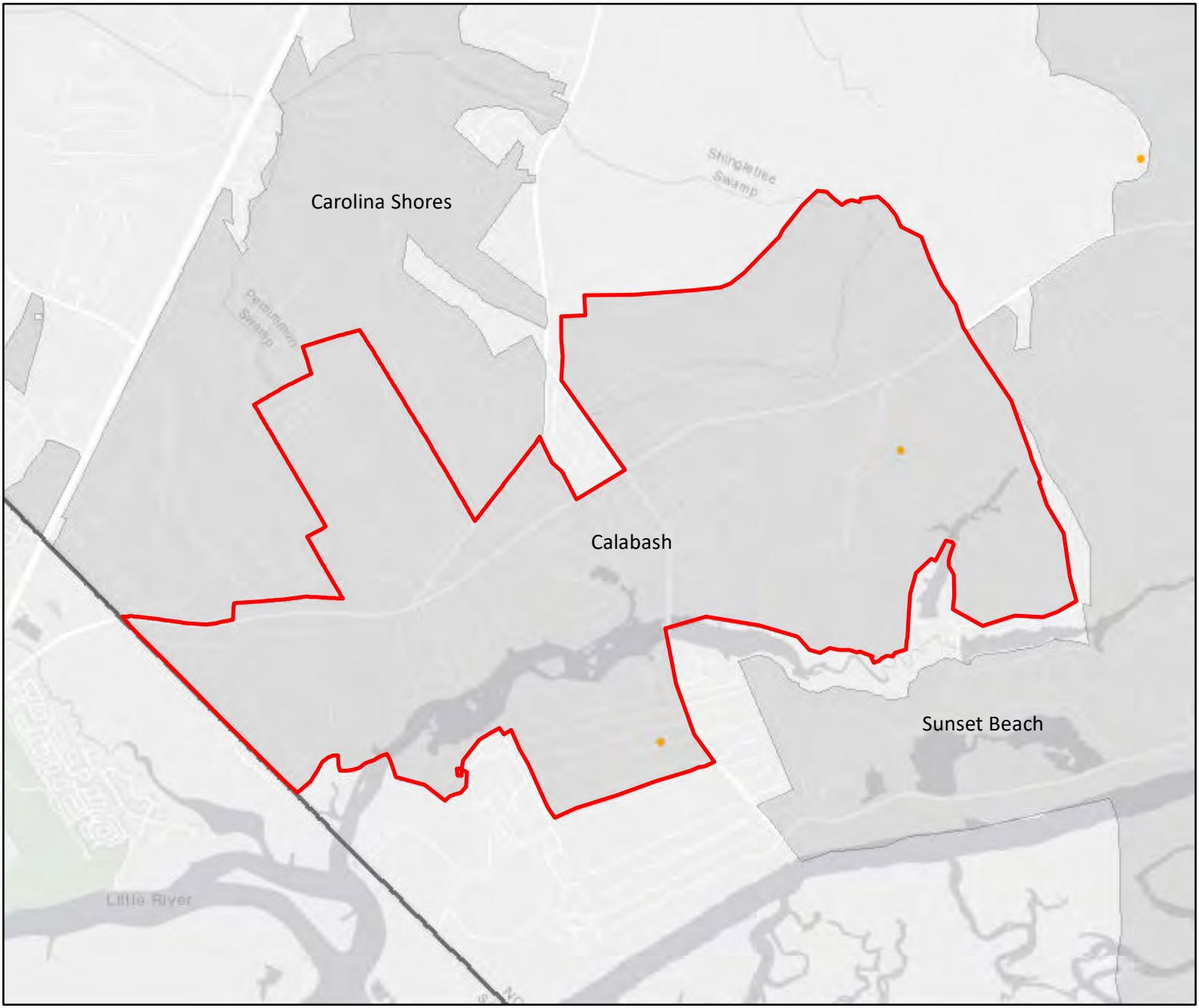
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Calabash - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

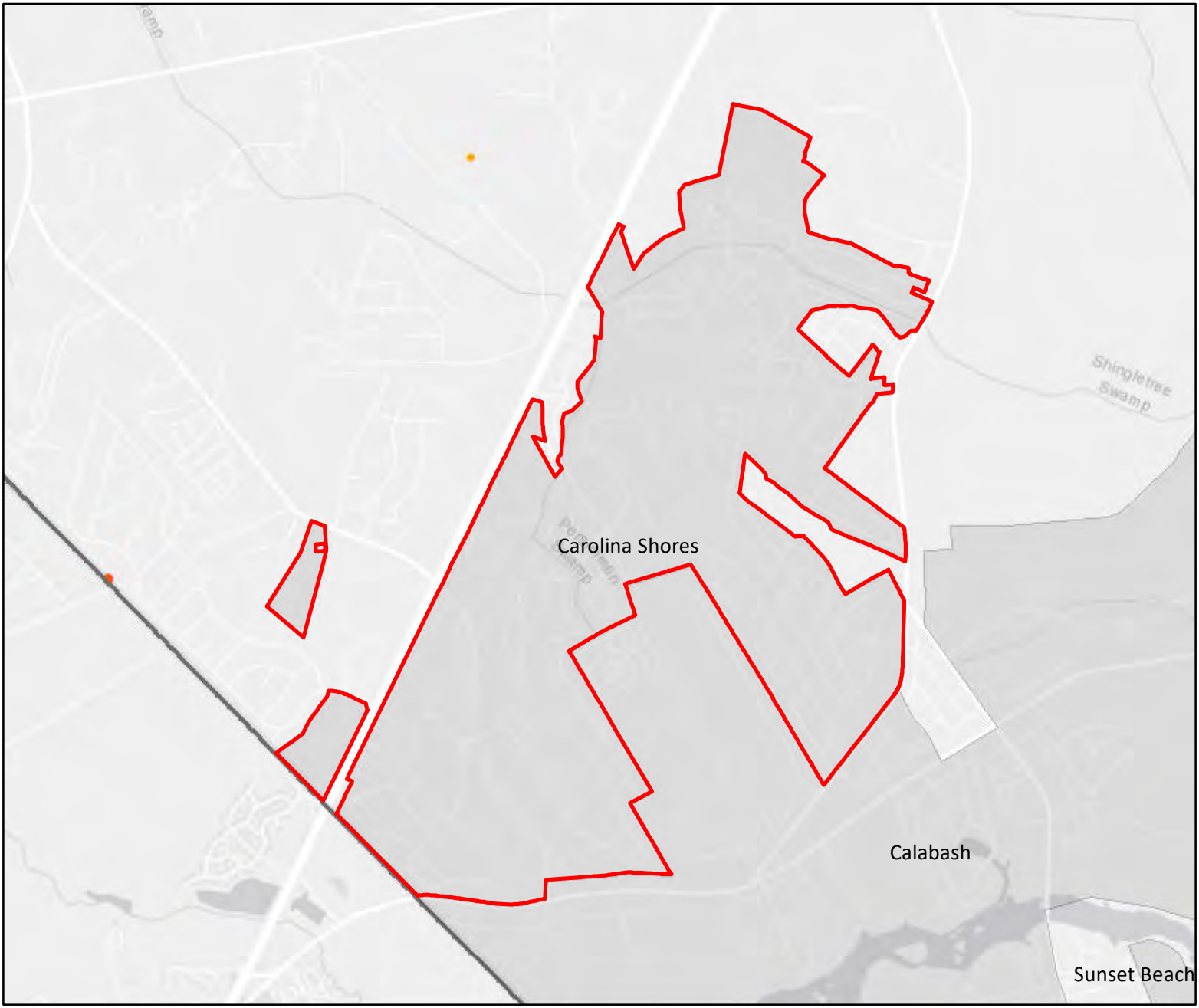
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Carolina Shores - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

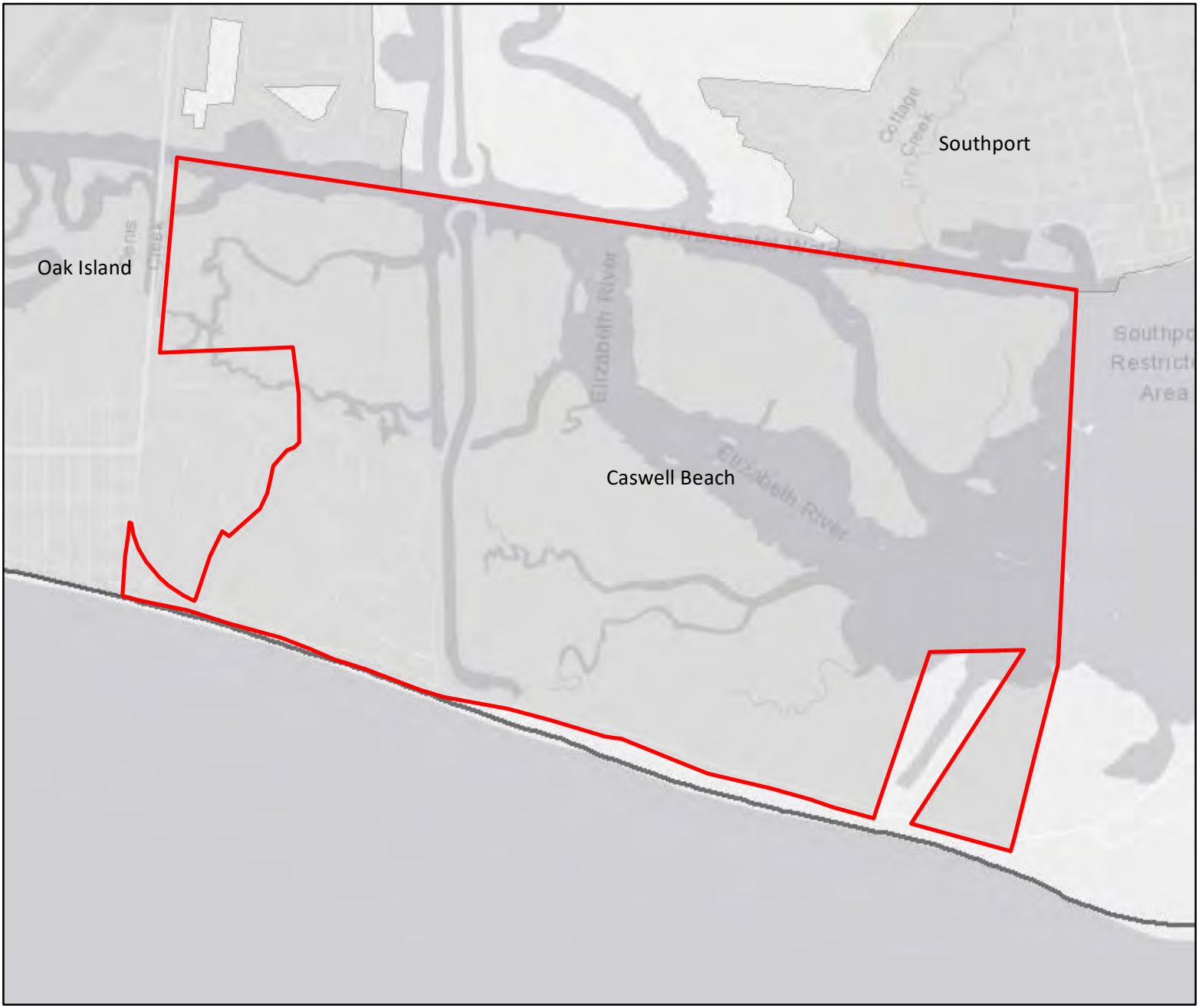
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Caswell Beach - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

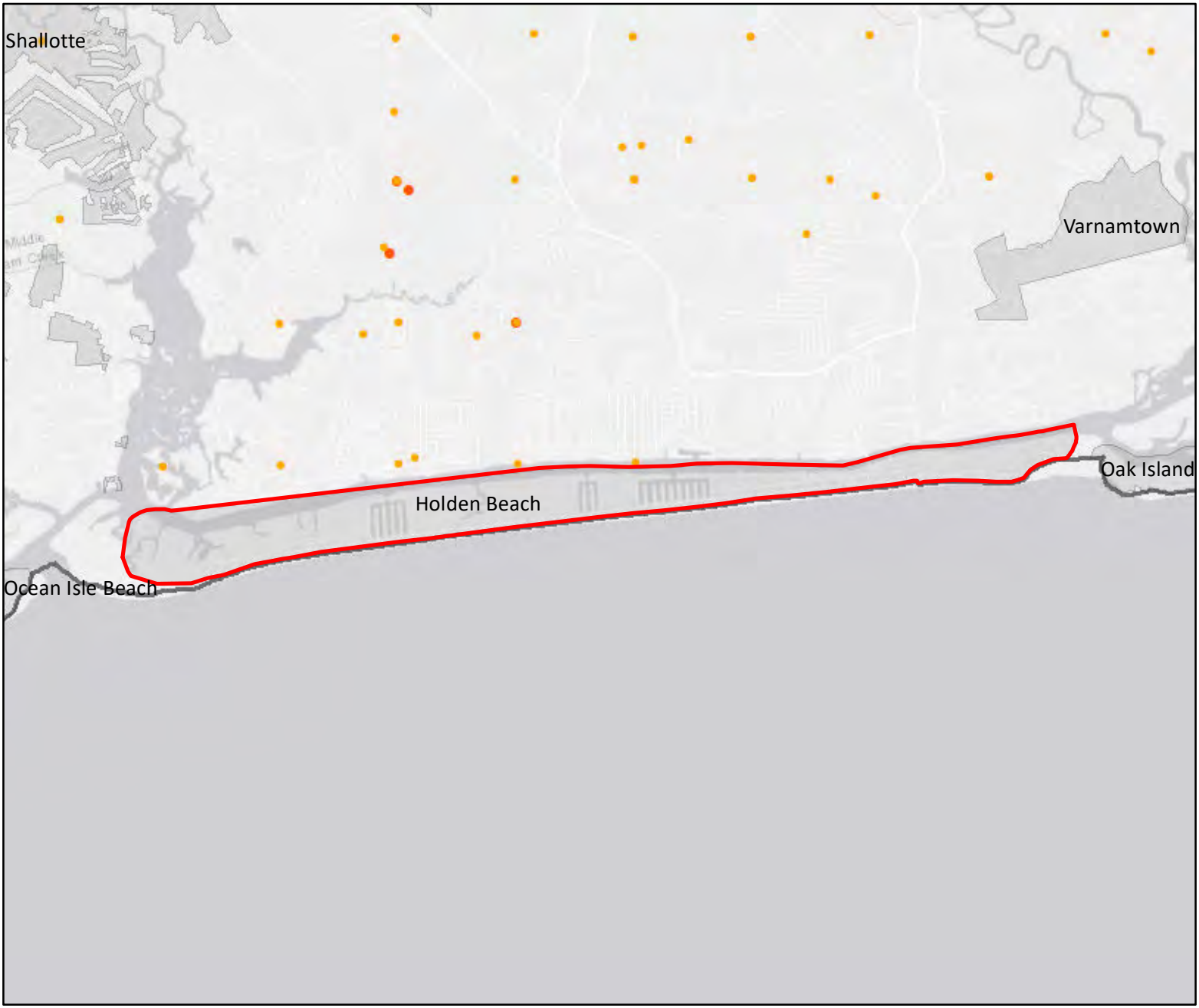
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Holden Beach - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

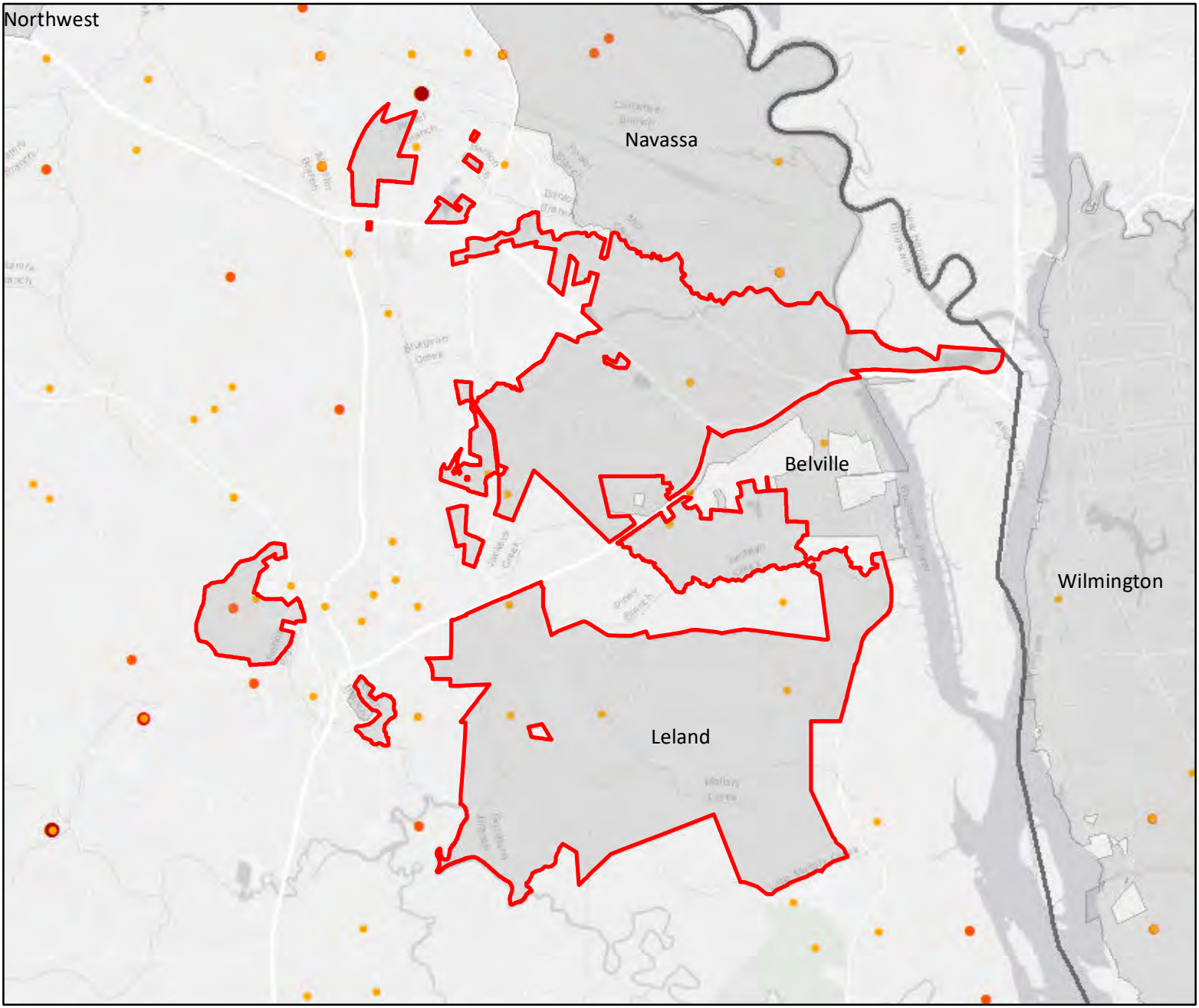
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Leland - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

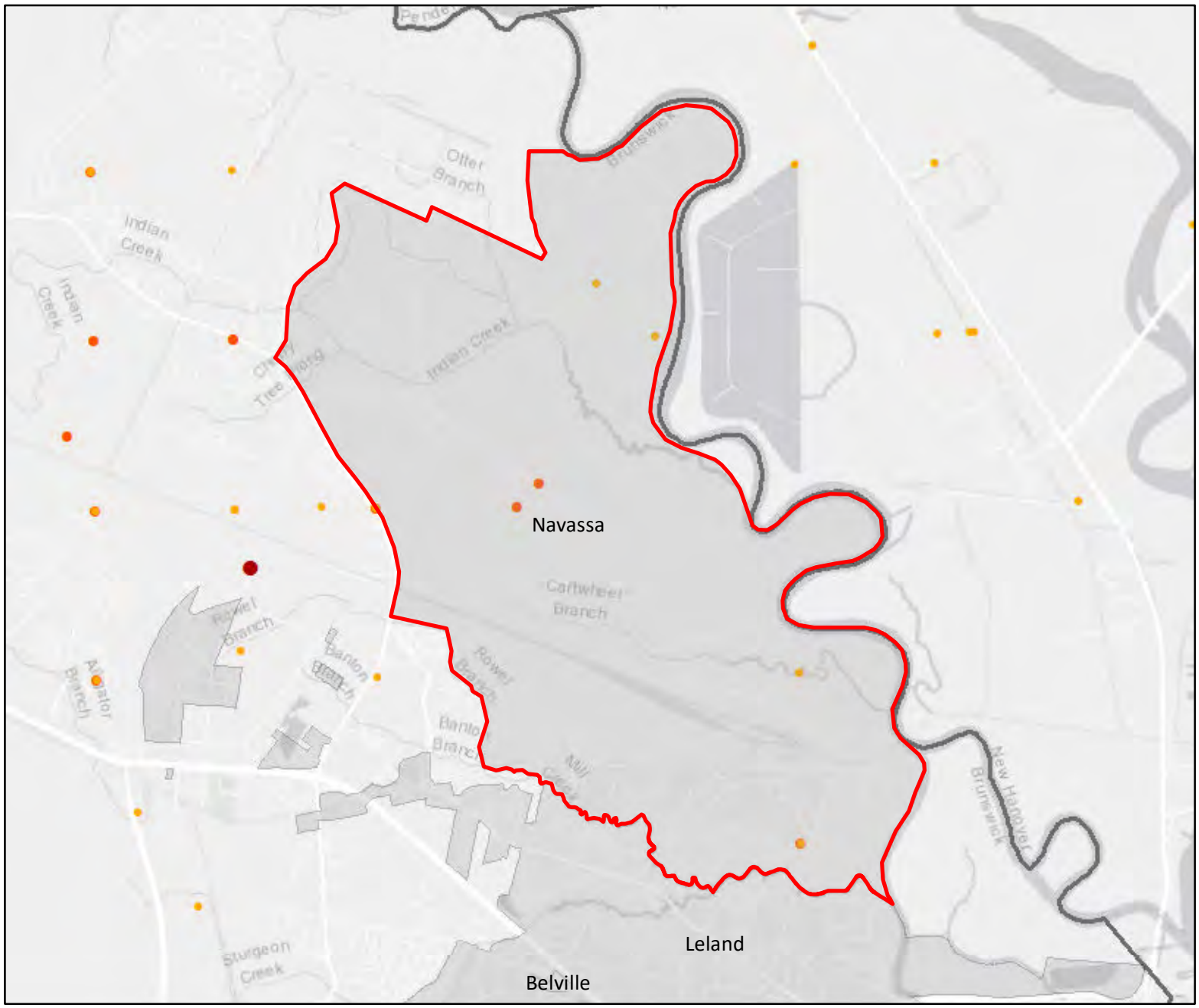
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Navassa - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

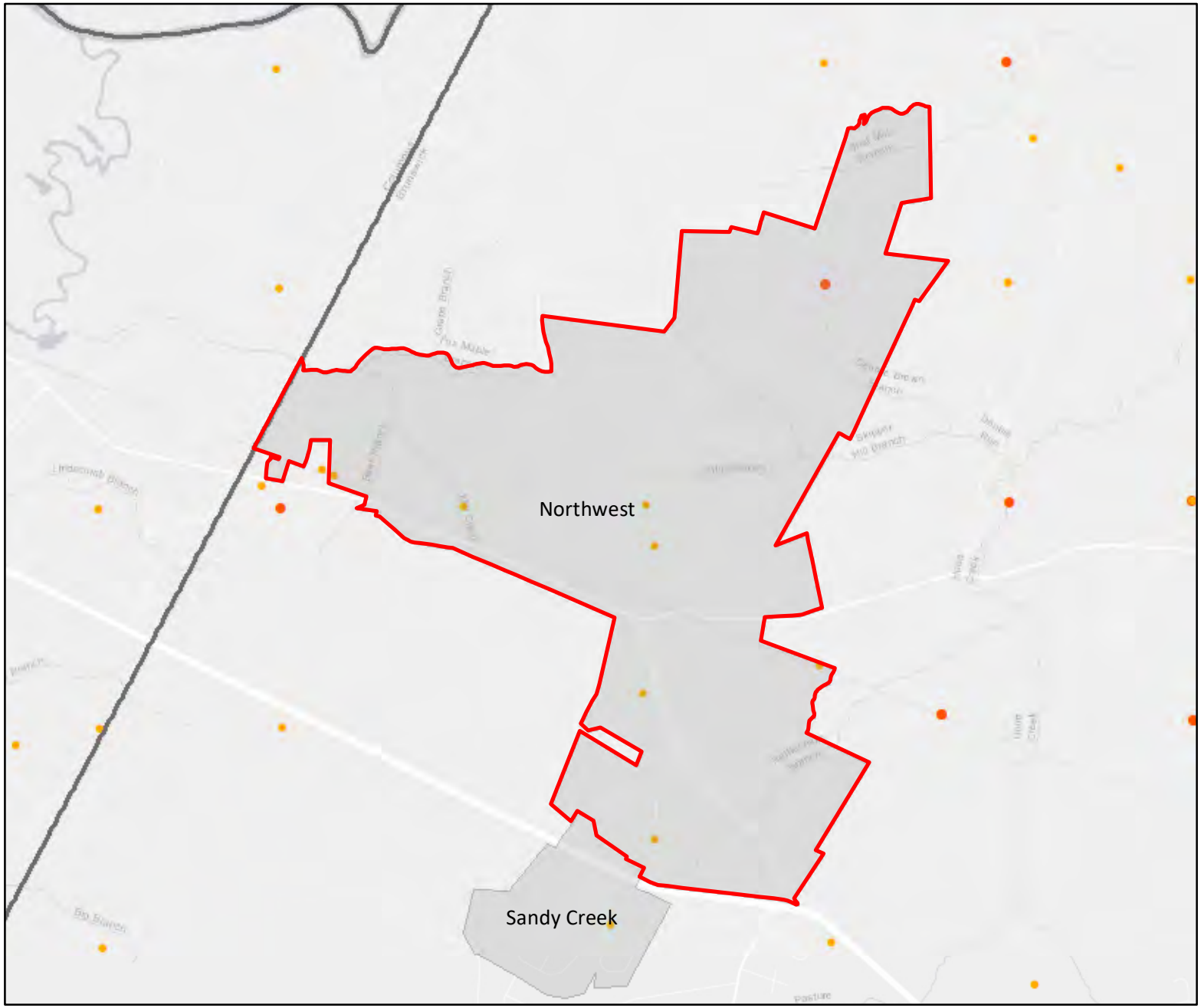
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Northwest - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

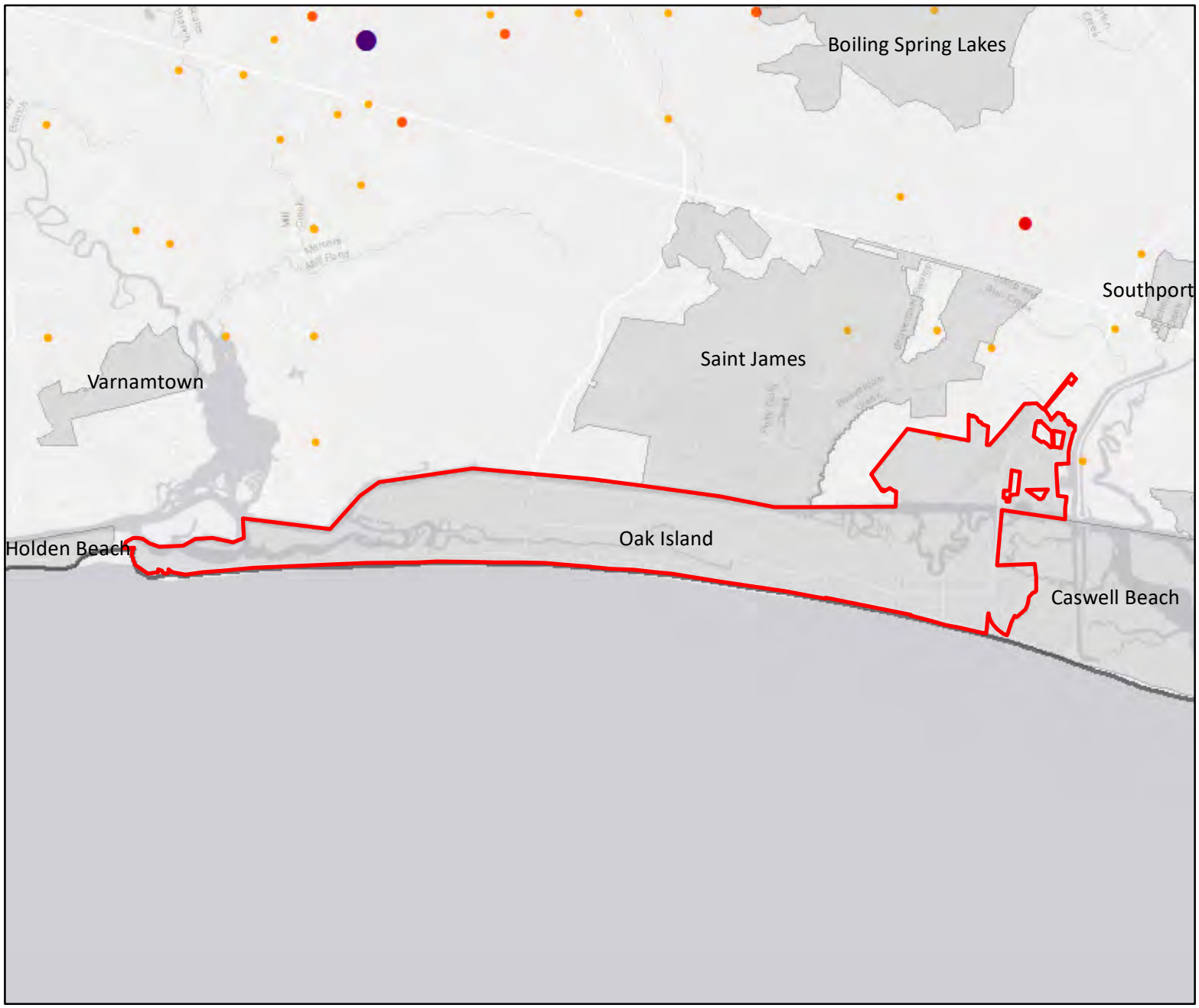
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Oak Island - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

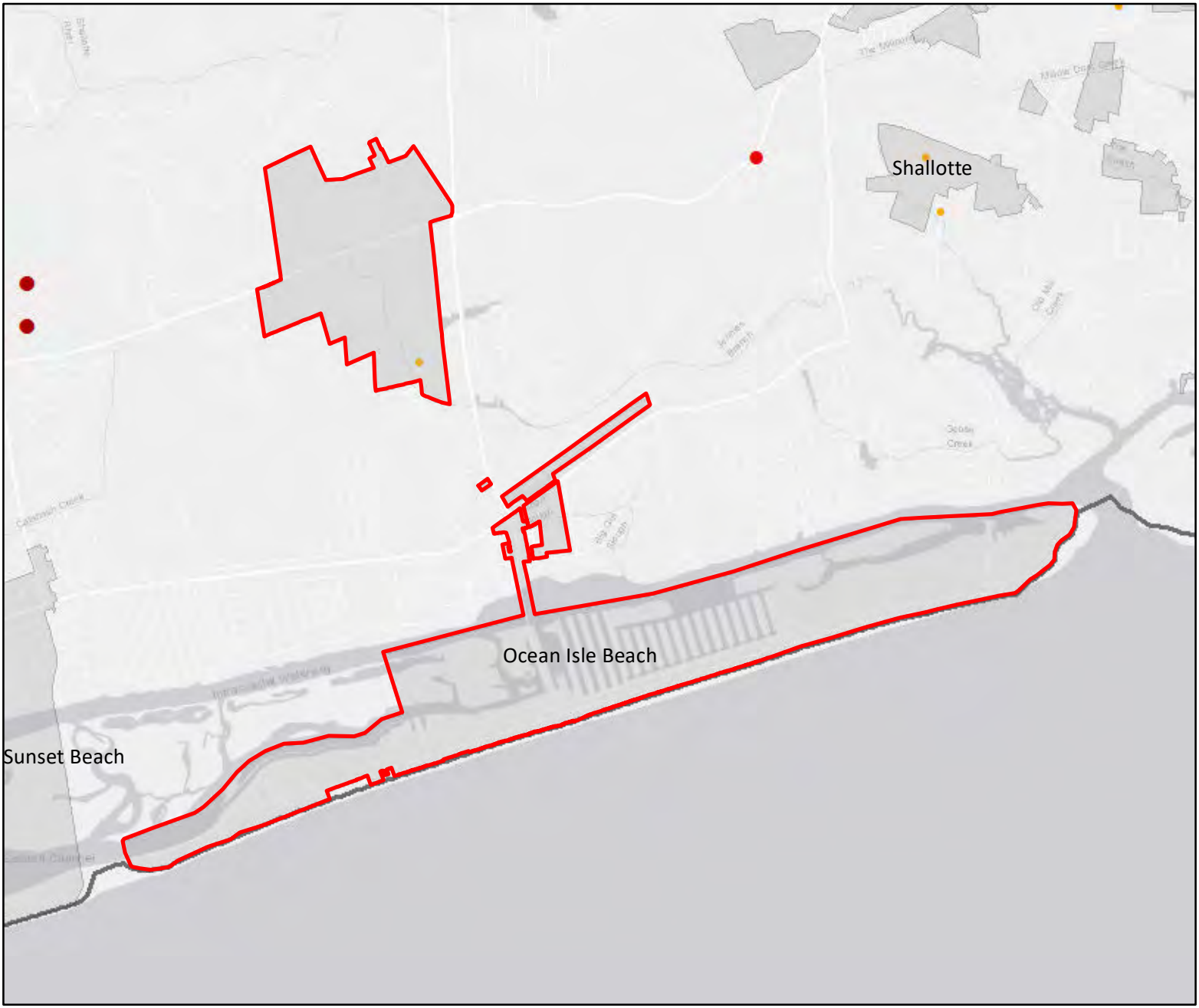
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Ocean Isle Beach - Wildfire Events



Legend

Municipal Boundary

County Boundary

Acres Impacted

1 - 10
11 - 50
51 - 100
101 - 500
501 - 1000
>1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Sandy Creek - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

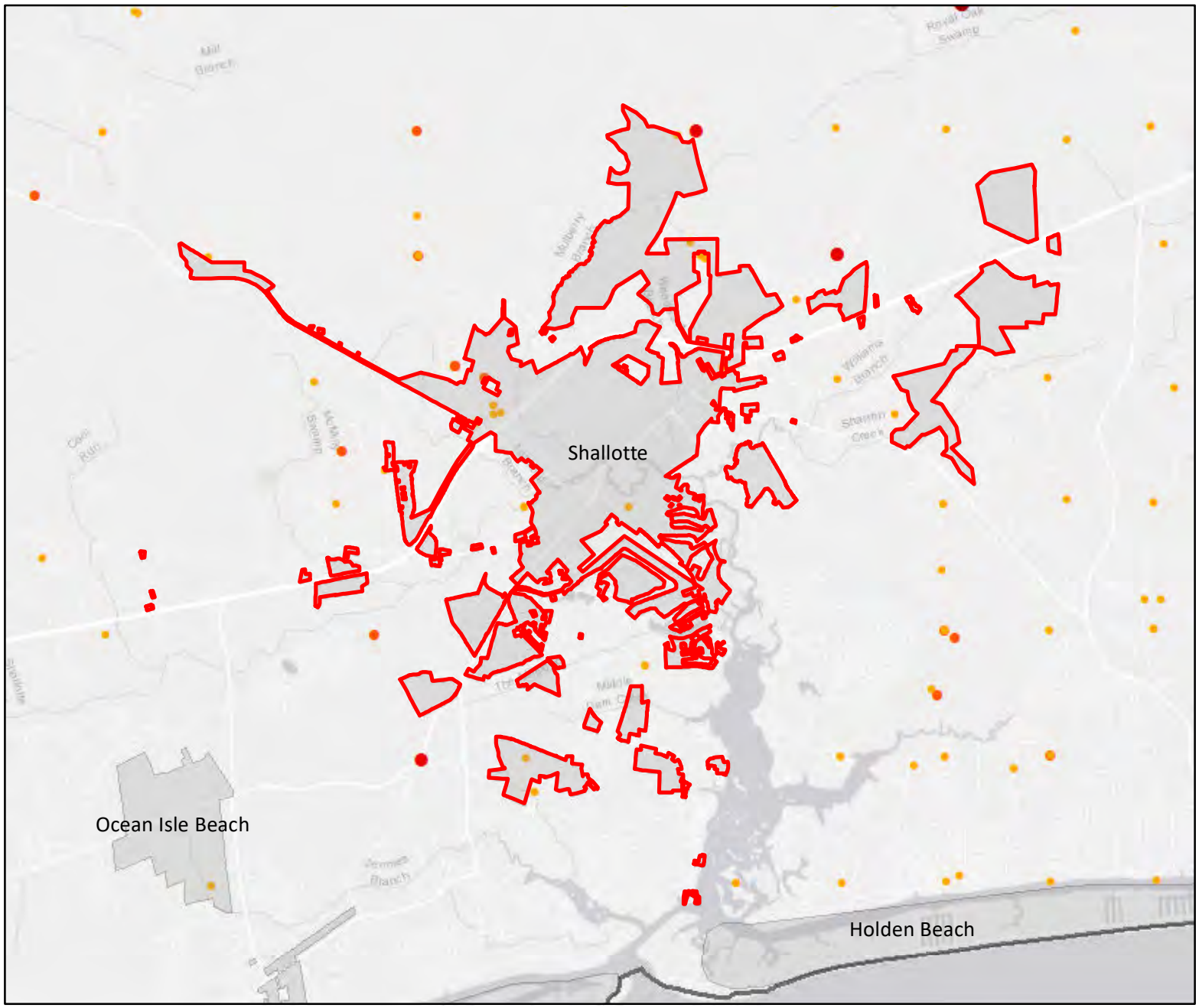
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Shallotte - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

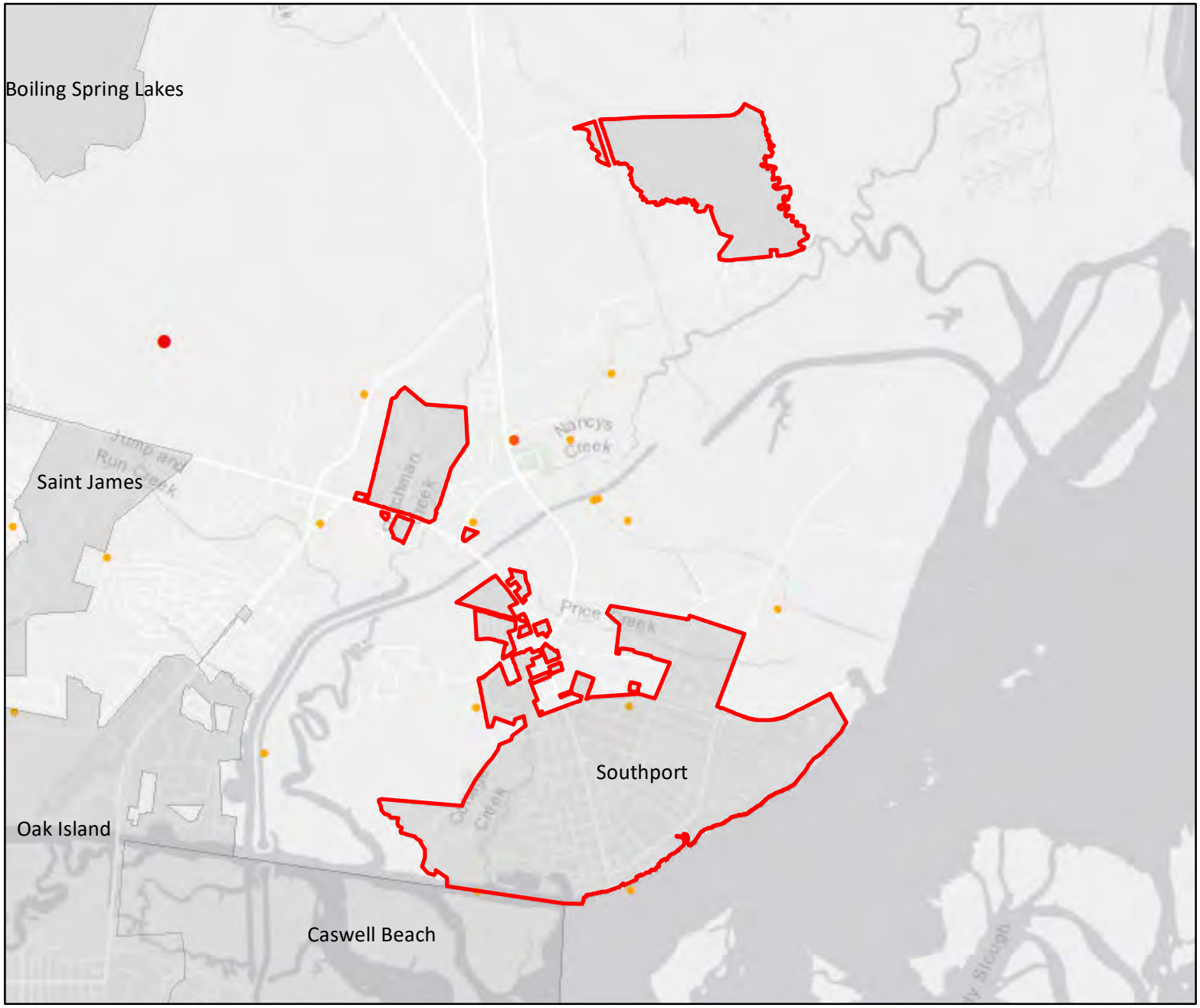
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Southport - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

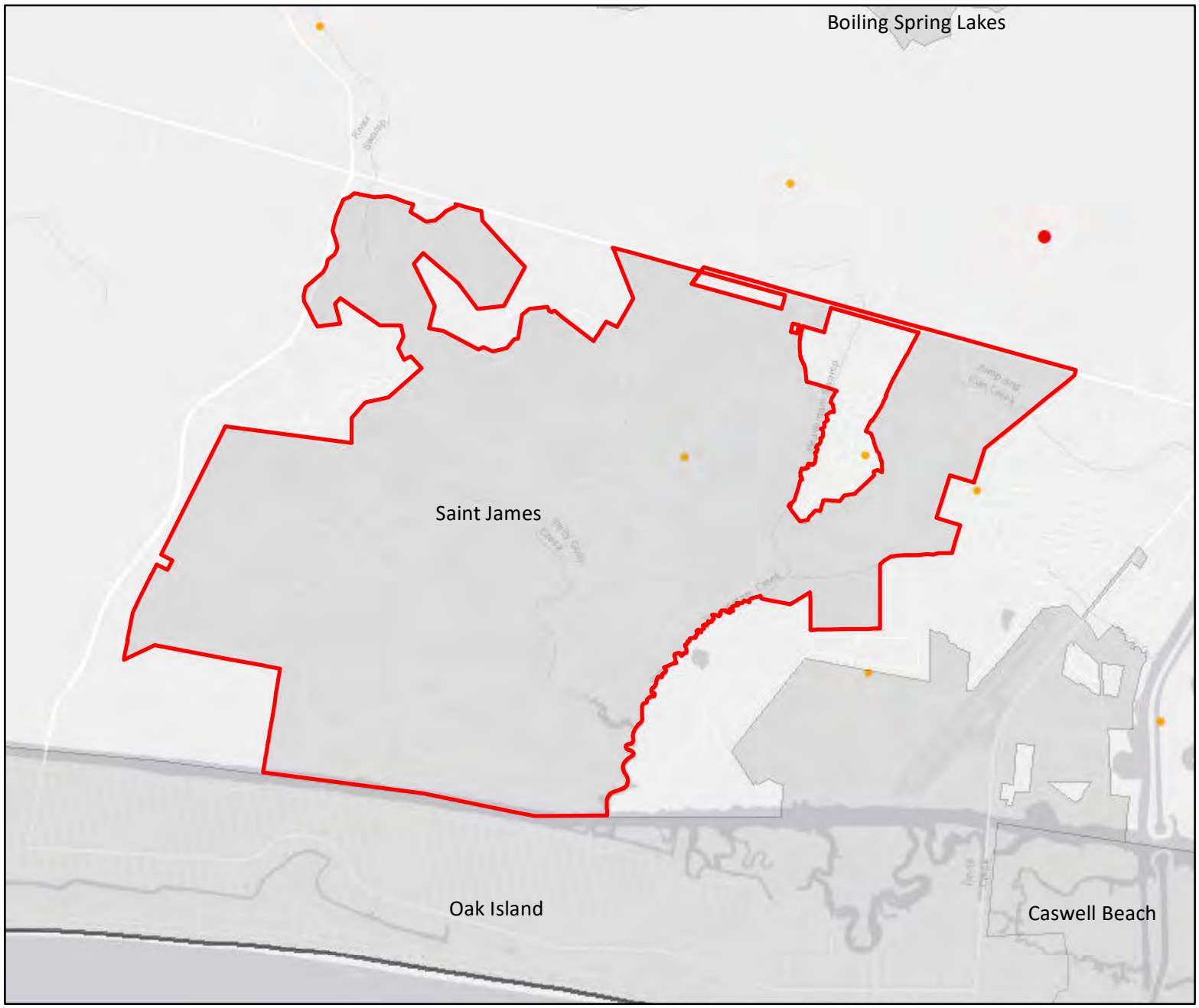
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Saint James - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

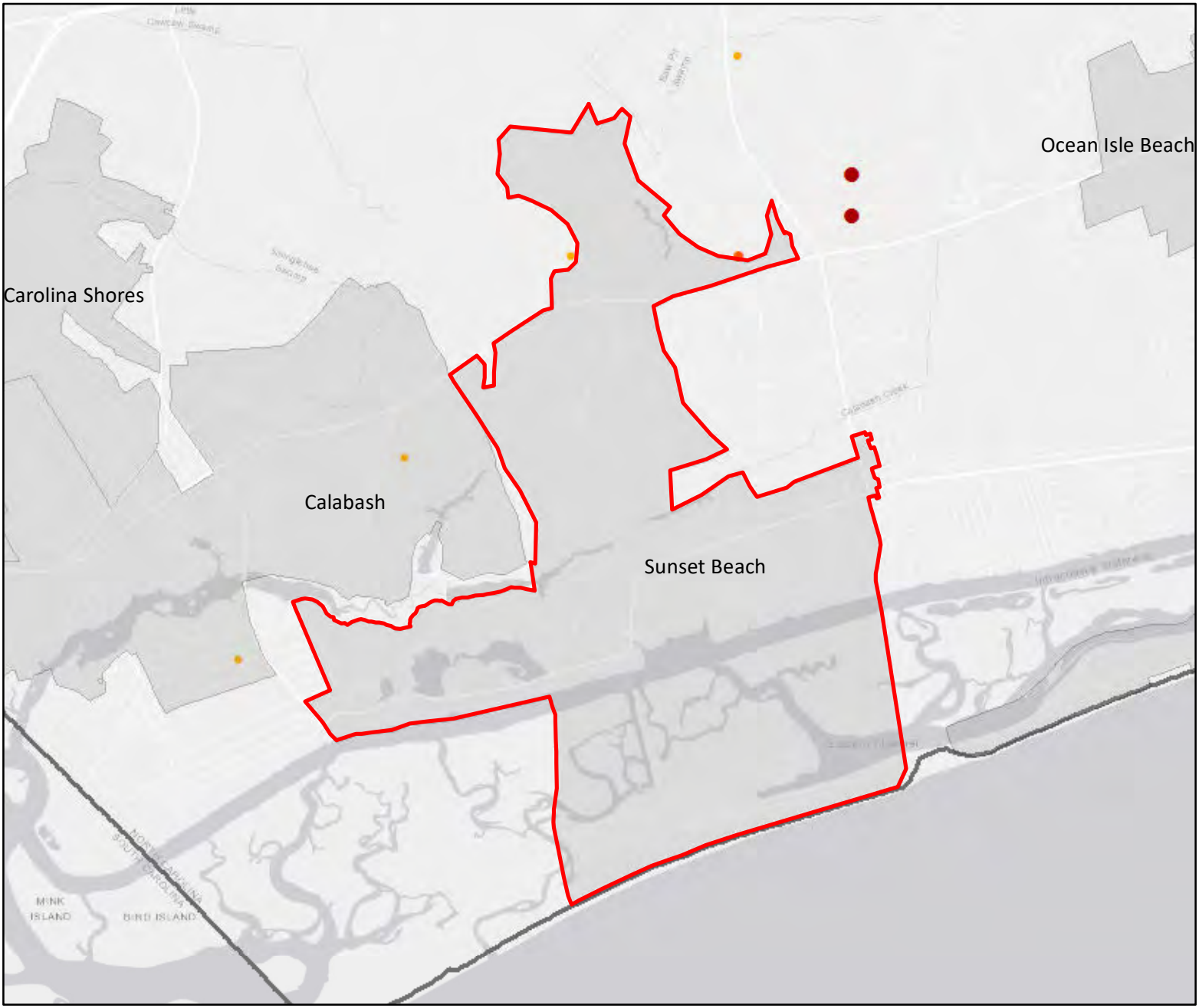
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Sunset Beach - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

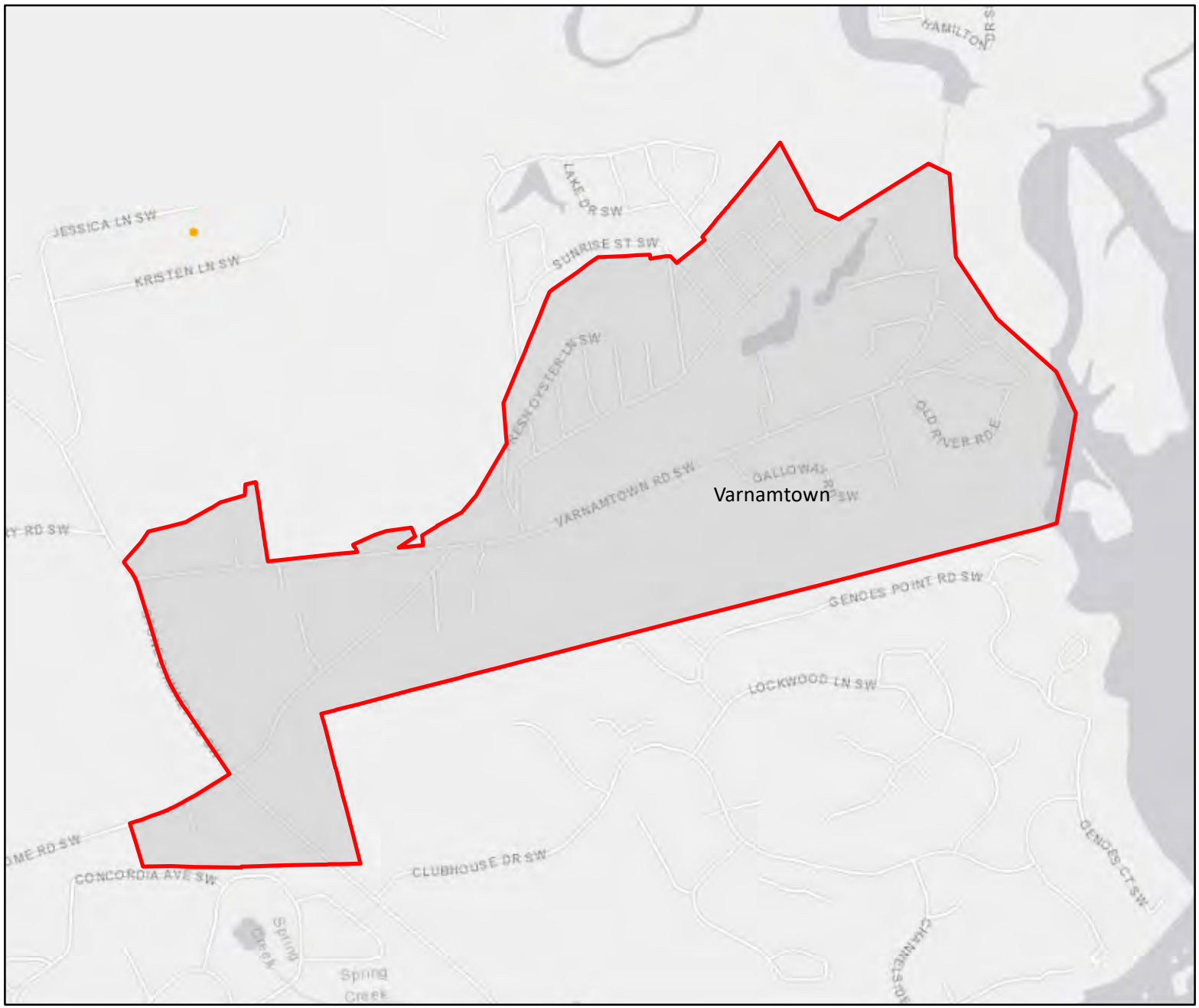
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Varnamtown - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

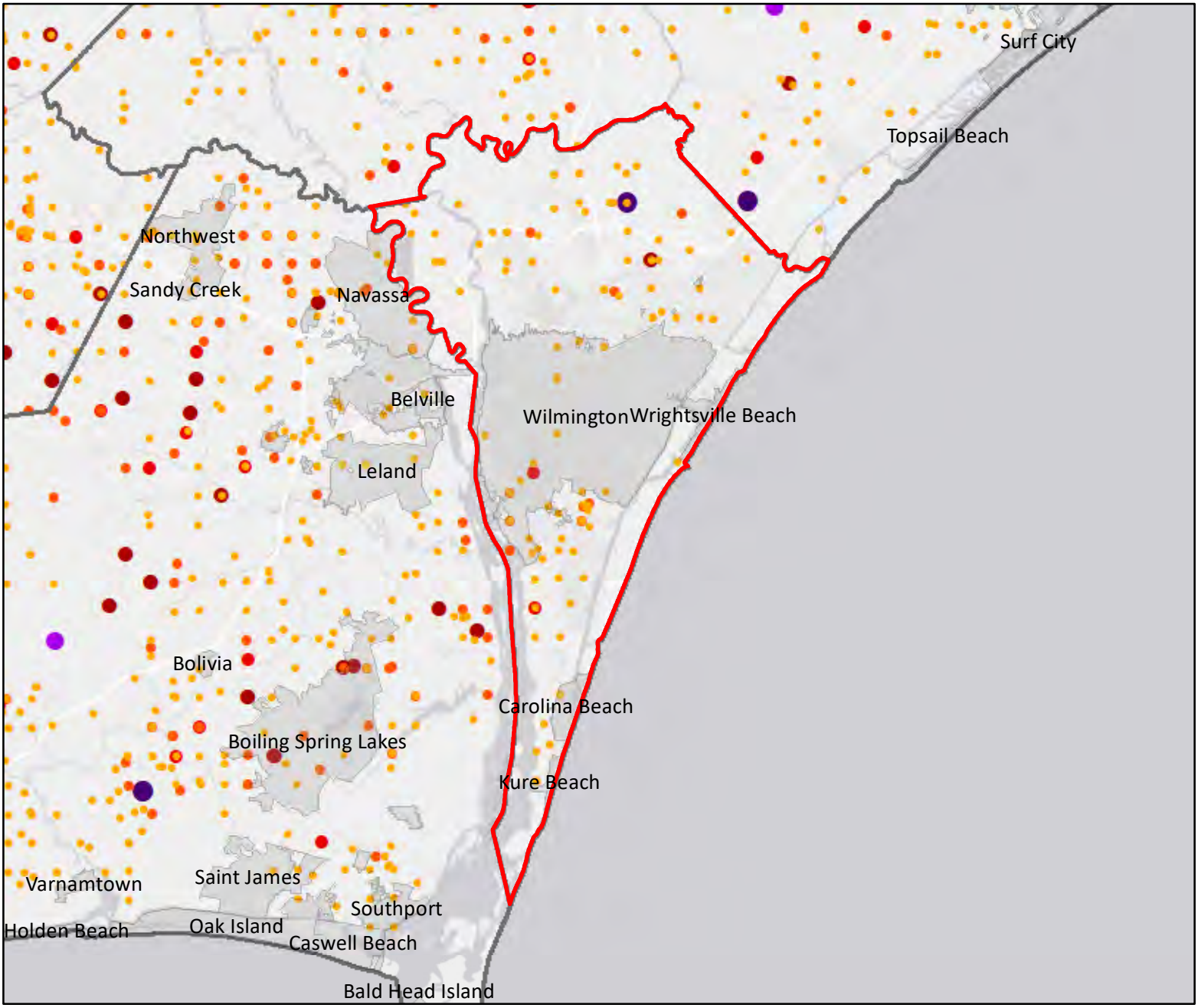
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

New Hanover County - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.5 7 14 Miles

N

Carolina Beach - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

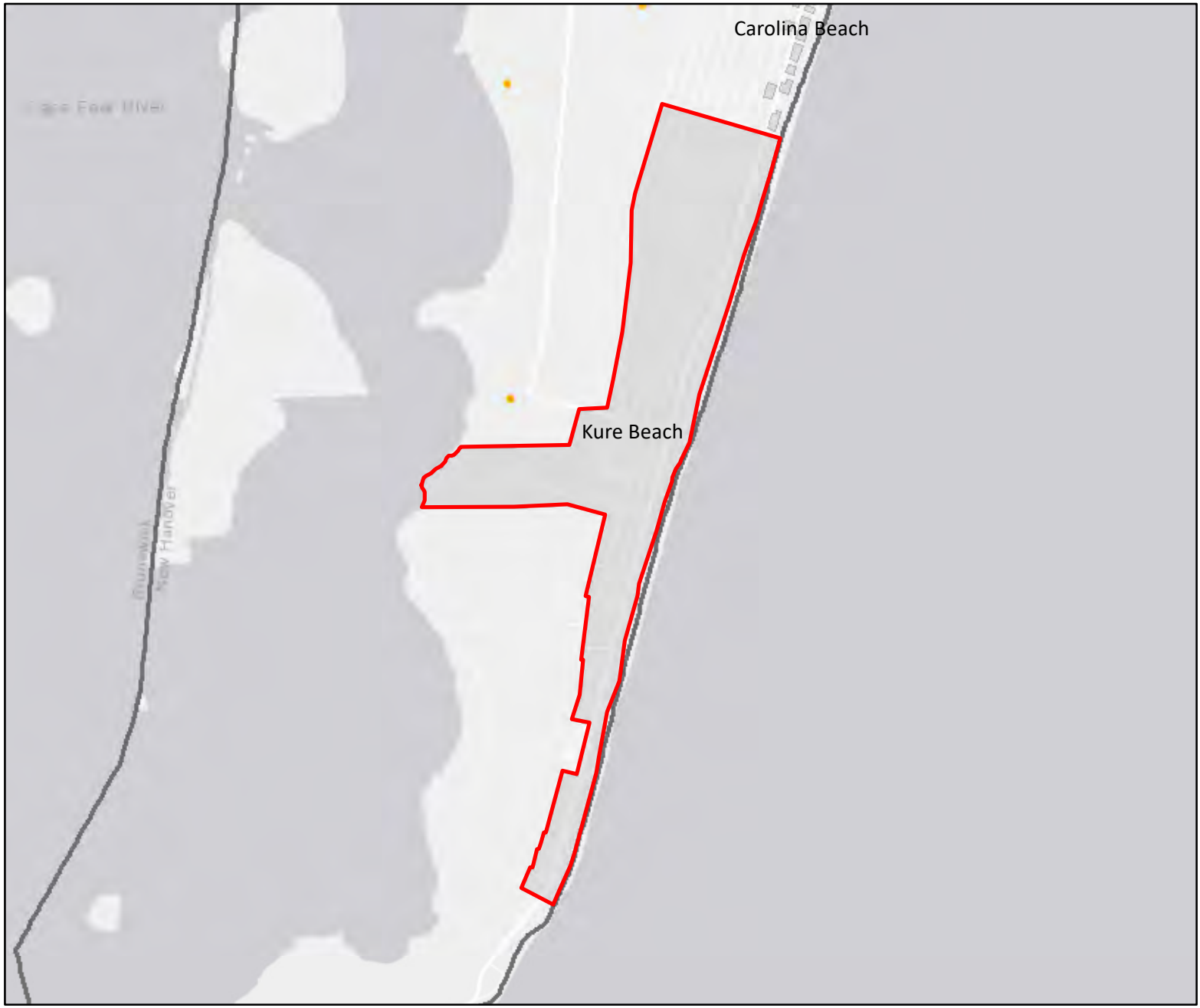
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Kure Beach - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

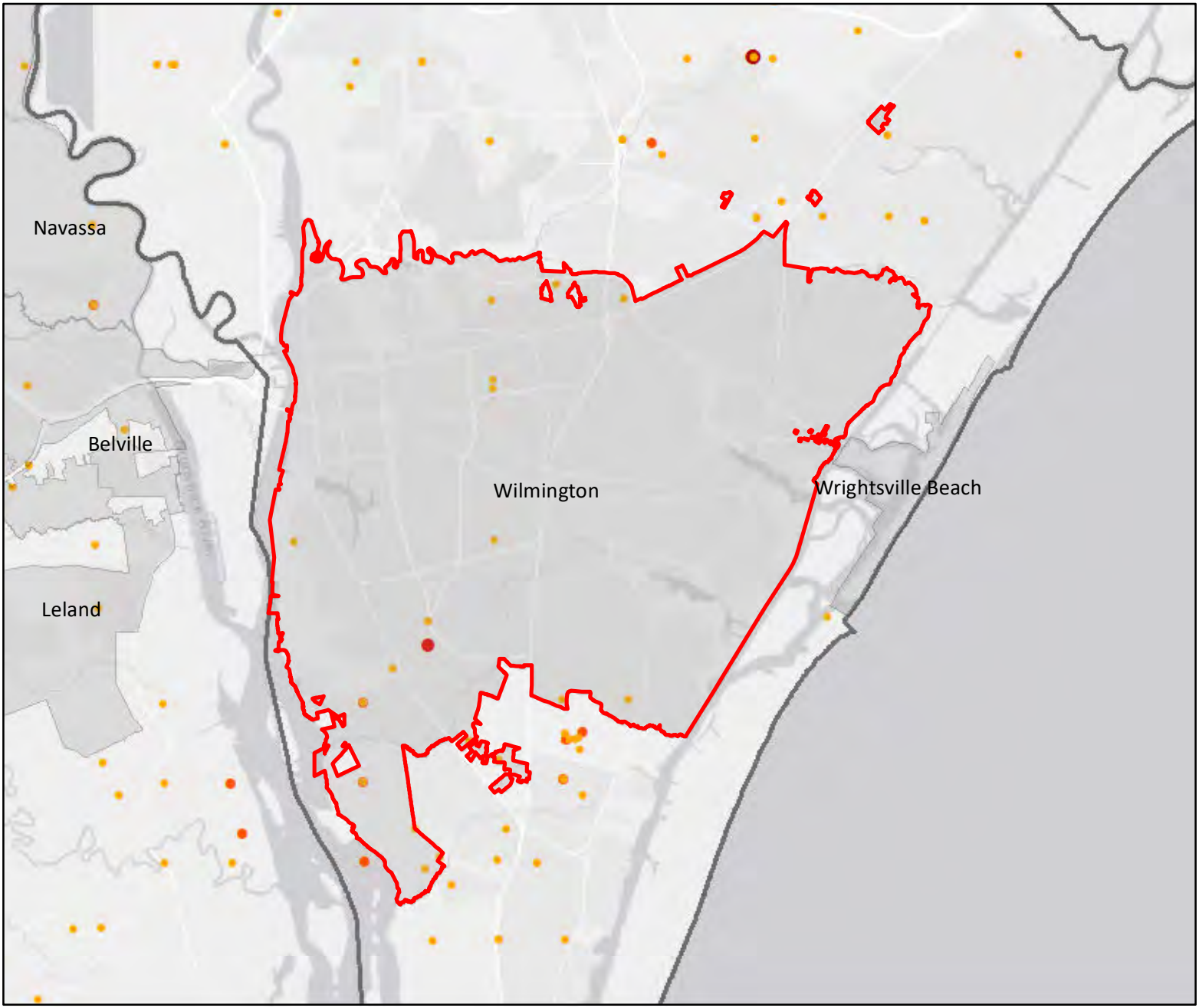
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Wilmington - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 1.25 2.5 5 Miles

N

Wrightsville Beach - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

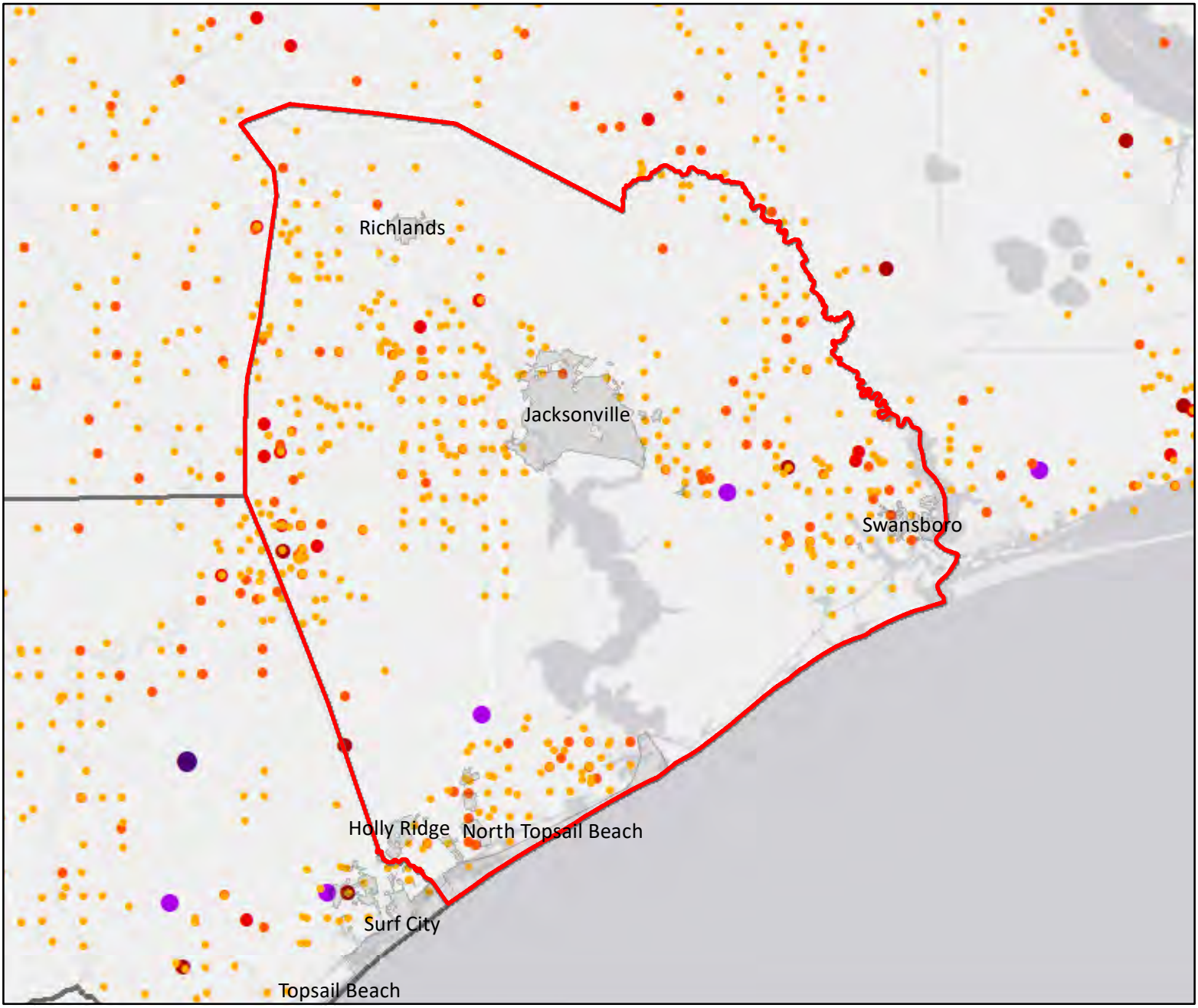
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.4 0.8 1.6 Miles

N

Onslow County - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

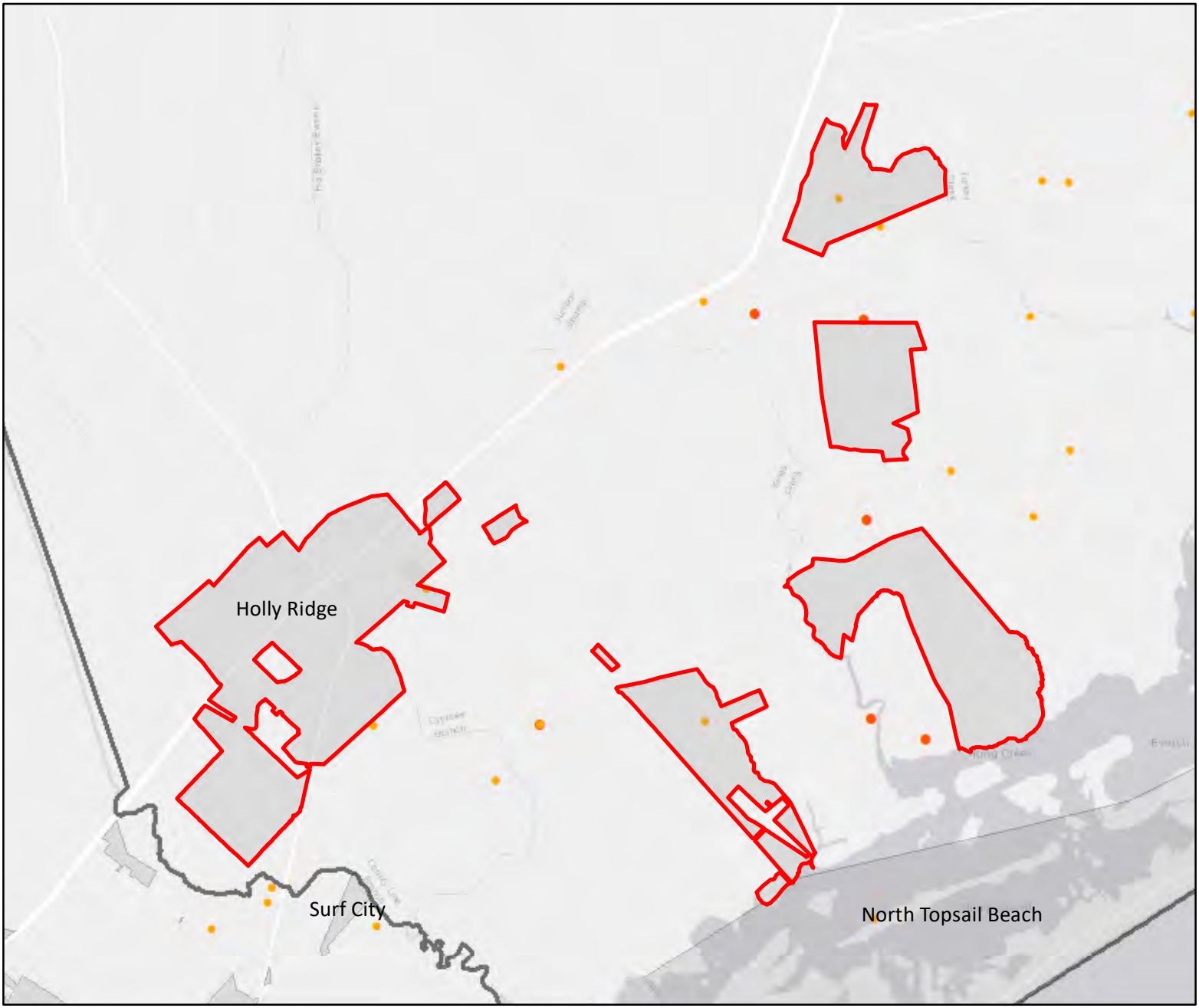
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Holly Ridge - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

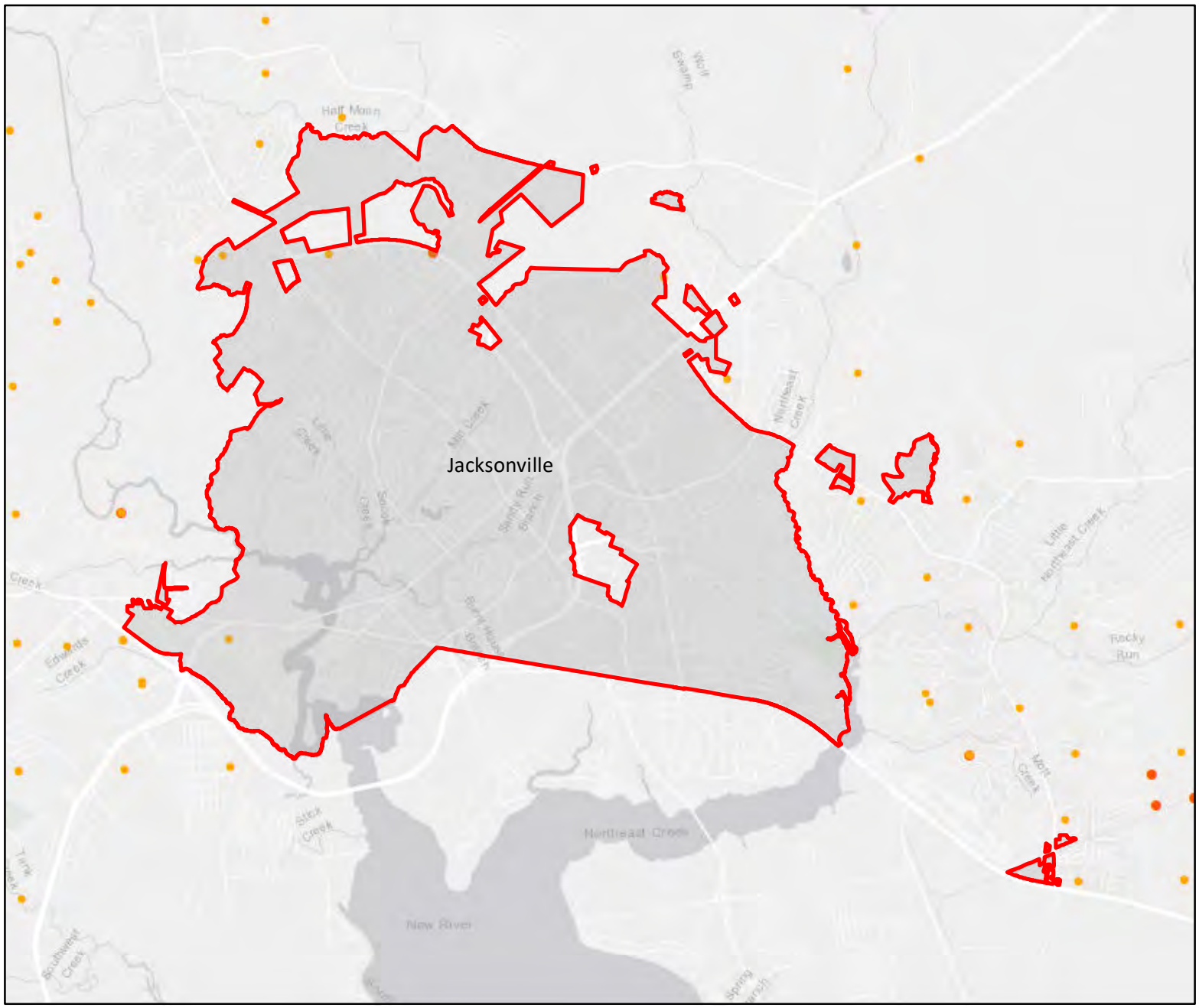
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Jacksonville - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

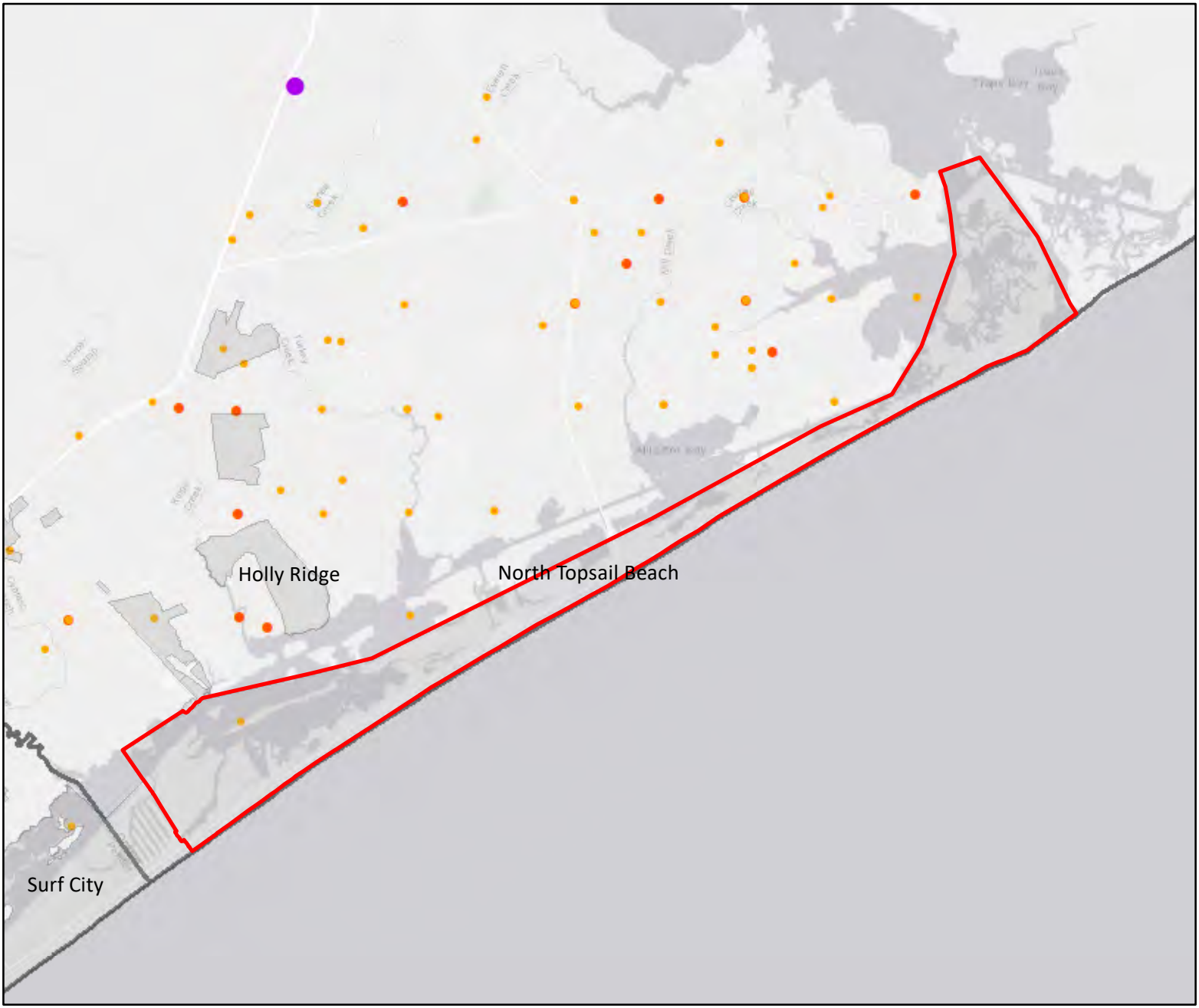
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

North Topsail Beach - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

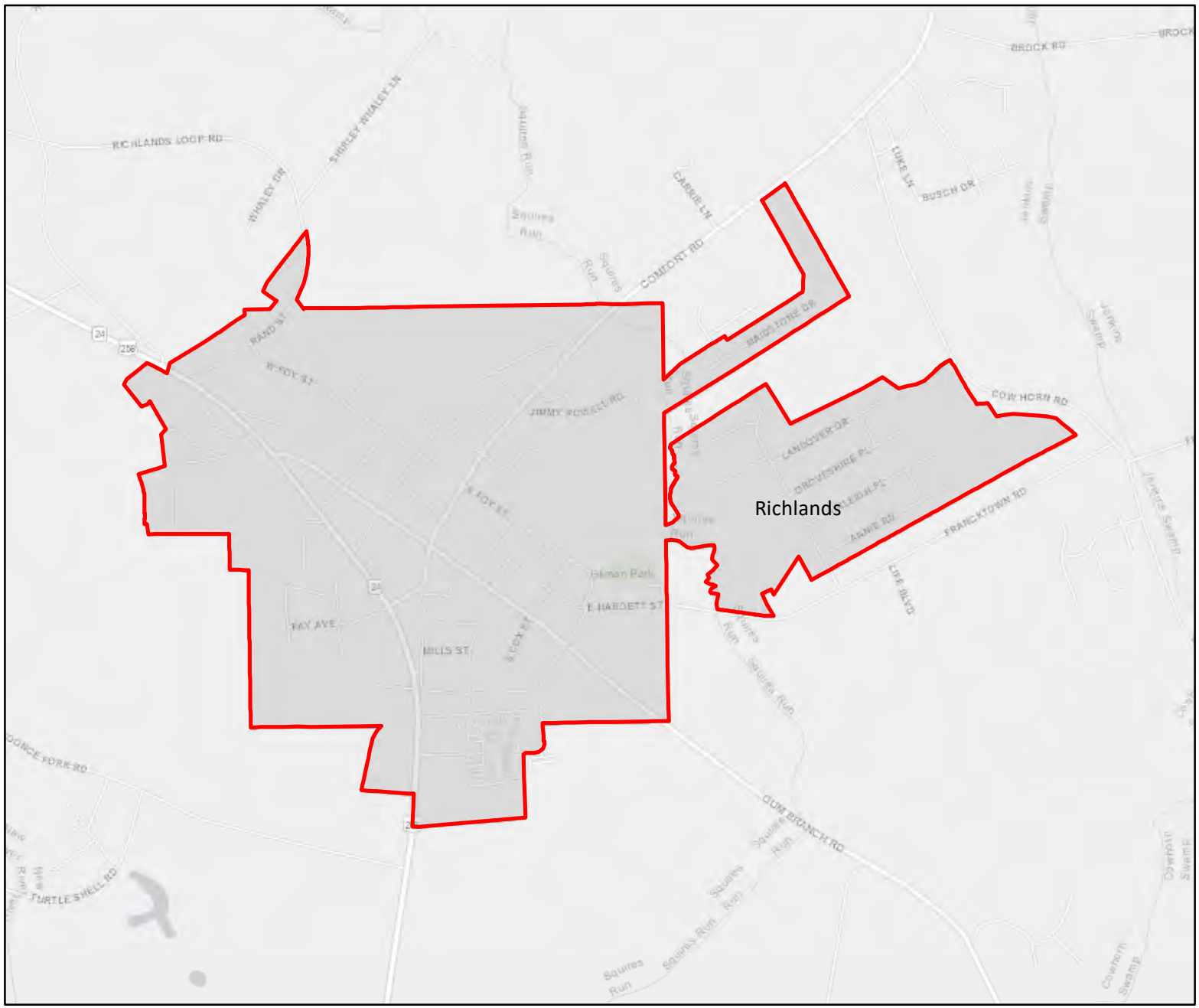
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 1 2 4 Miles

N

Richlands - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

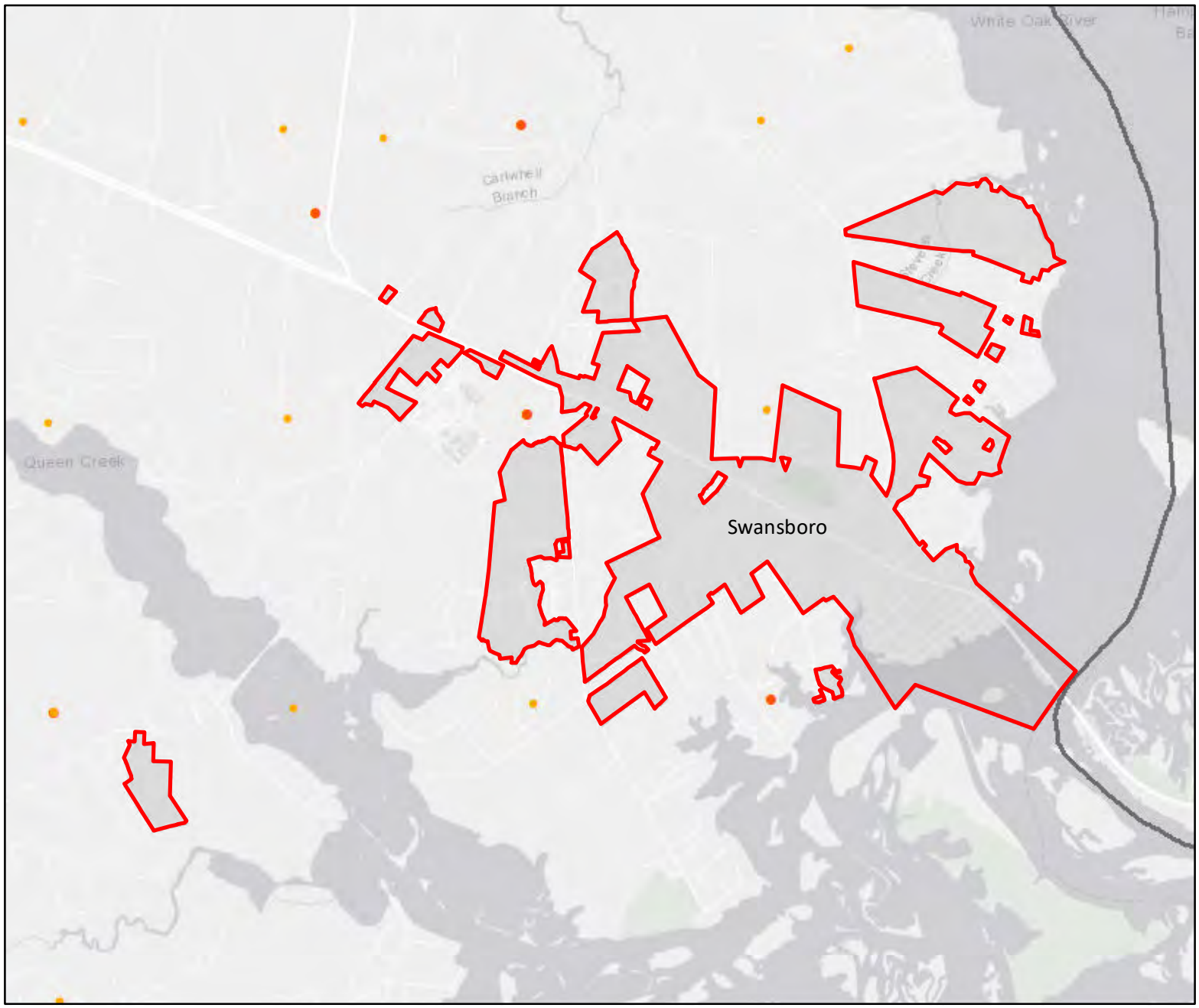
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.2 0.4 0.8 Miles

N

Swansboro - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

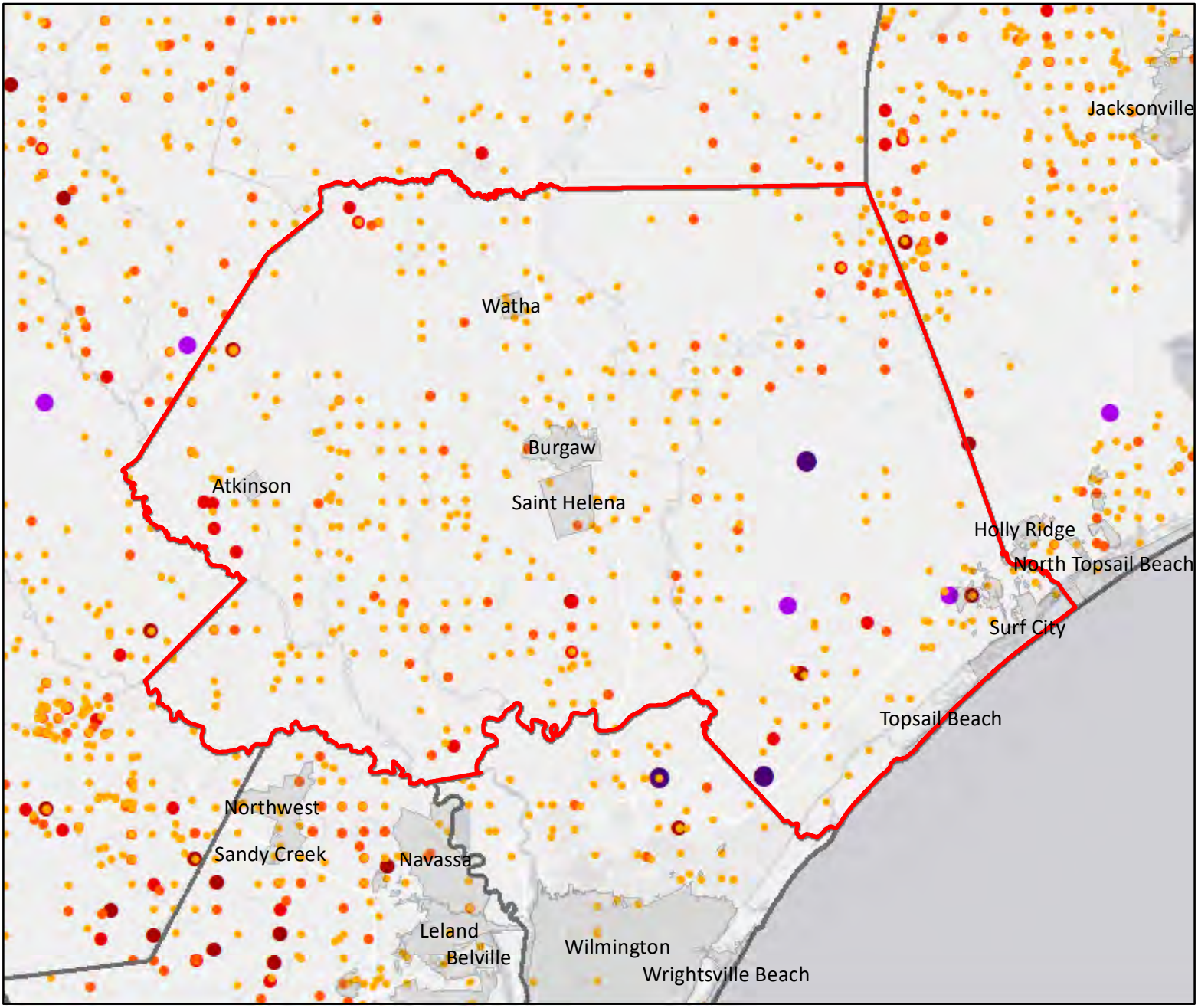
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Pender County - Wildfire Events



Legend

Municipal Boundary

County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Atkinson - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

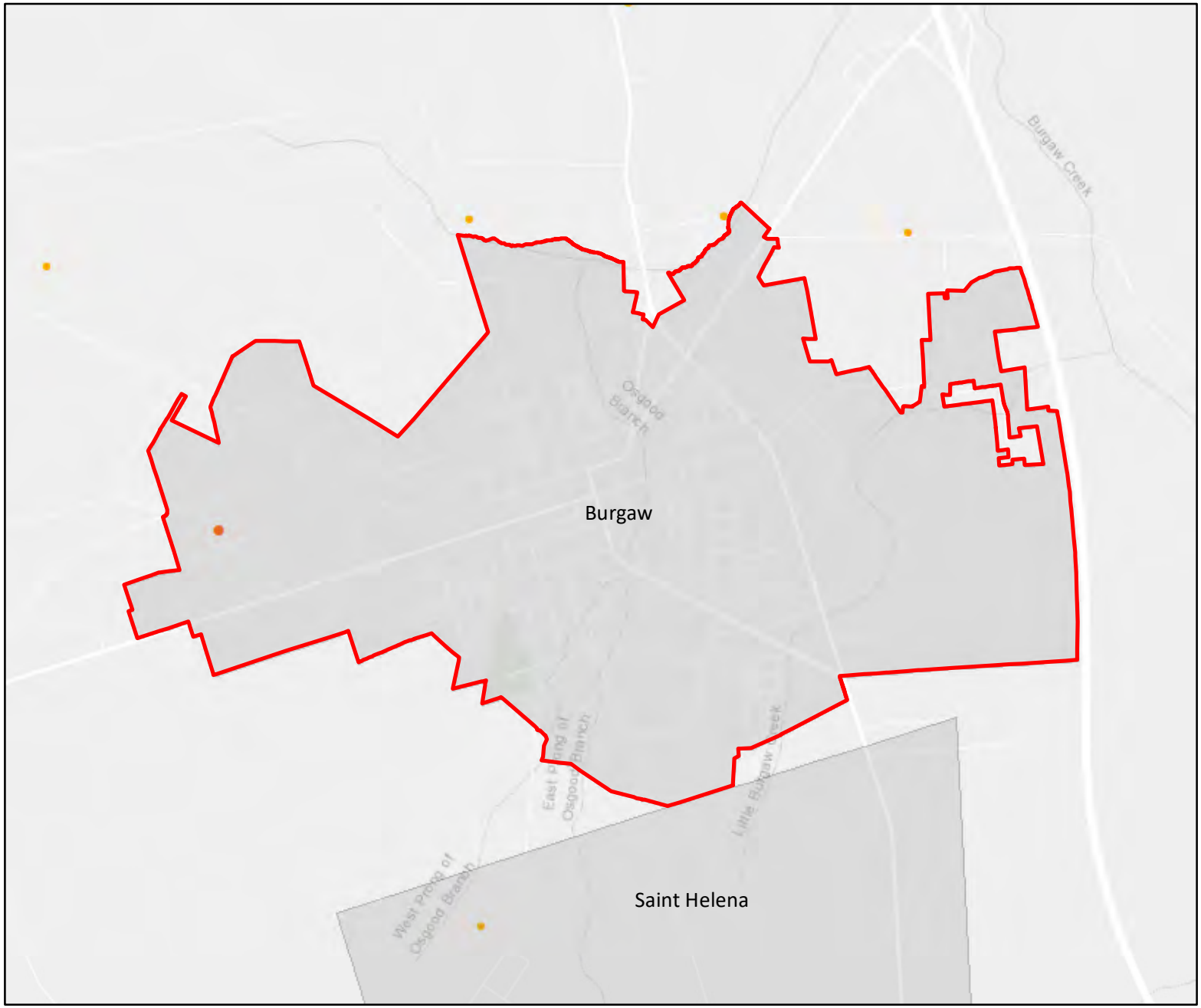
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

Burgaw - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

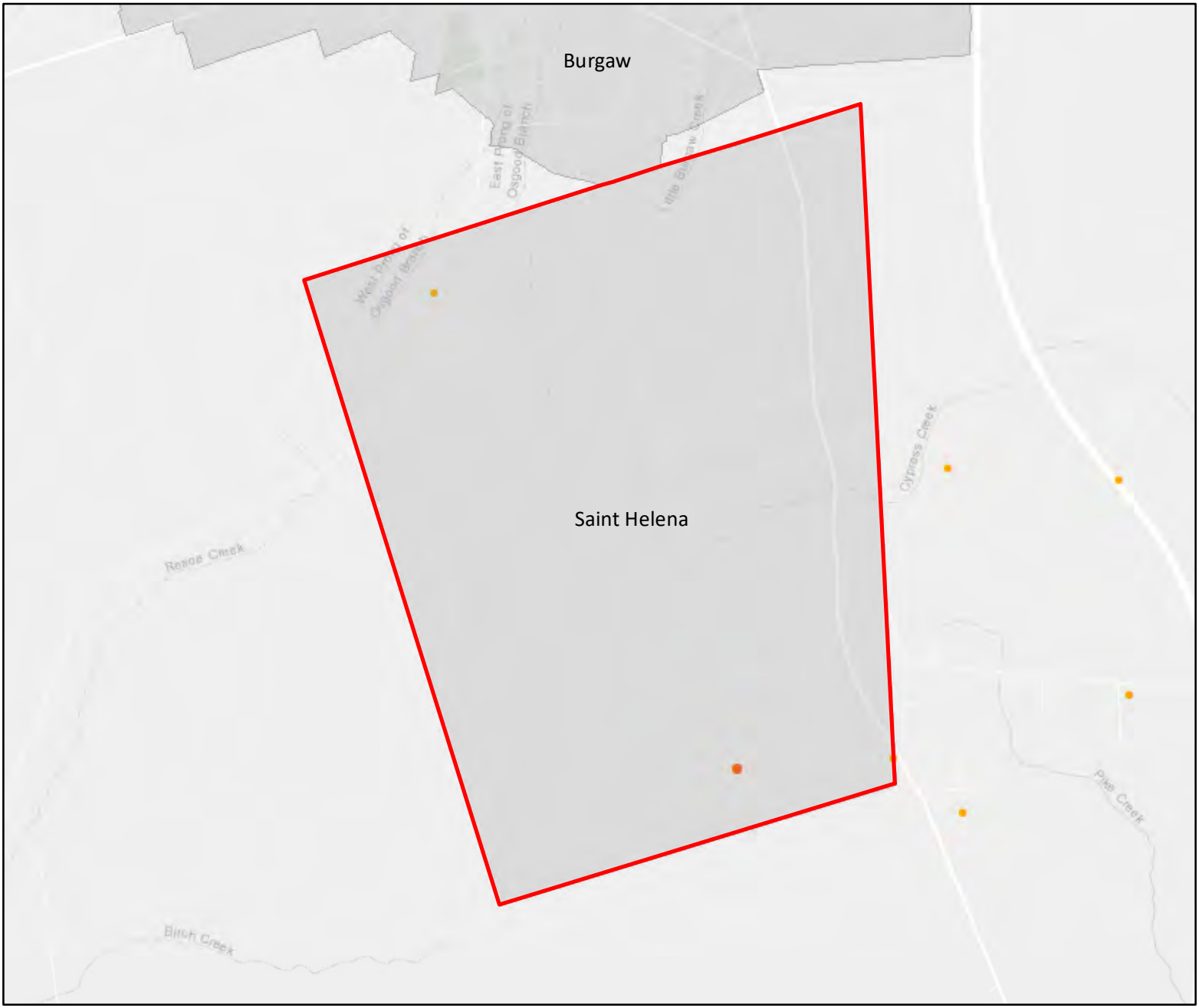
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.325 0.65 1.3 Miles

N

Saint Helena - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

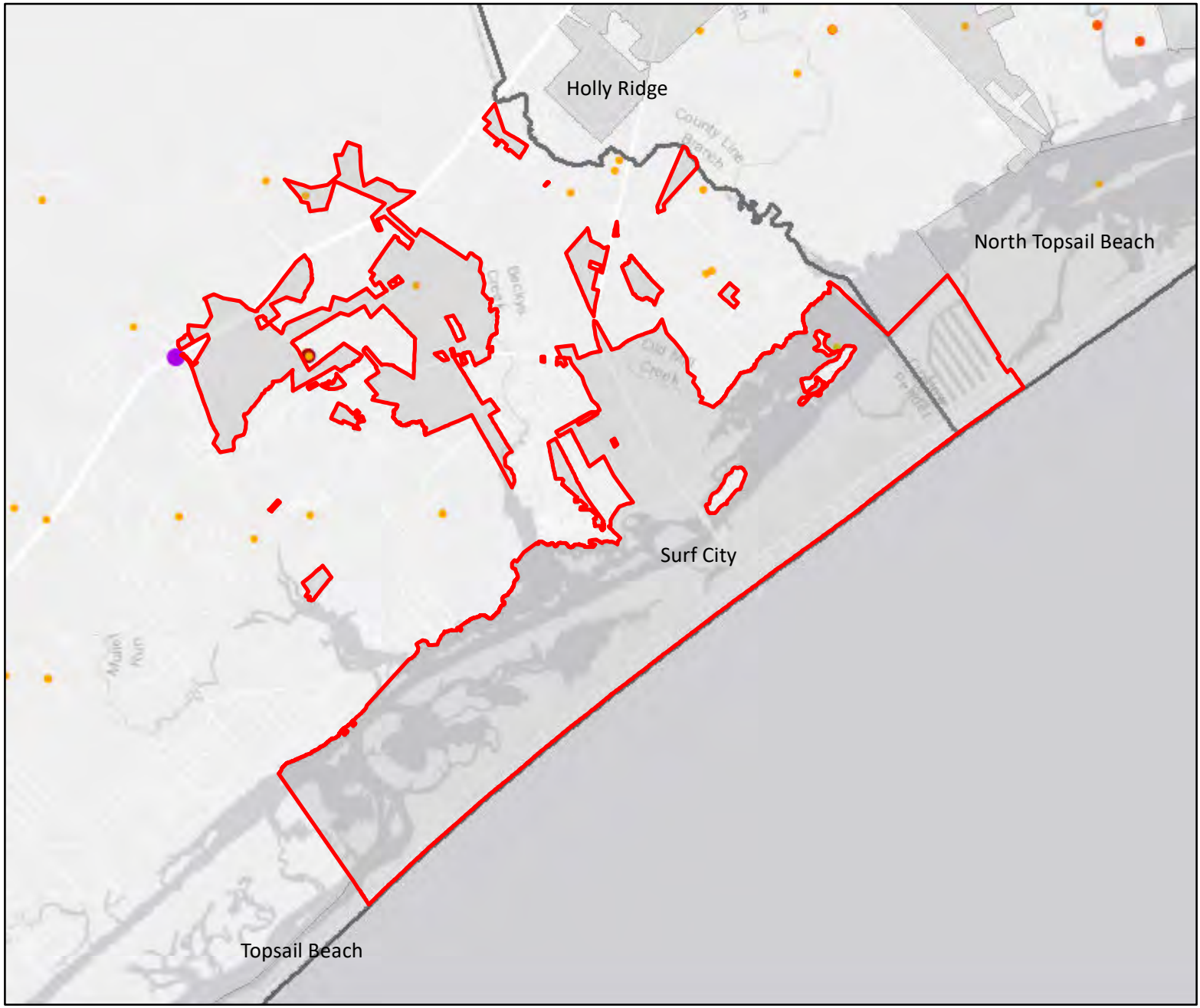
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Surf City - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Topsail Beach - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Watha - Wildfire Events

Legend

- Municipal Boundary
- County Boundary

Acres Impacted

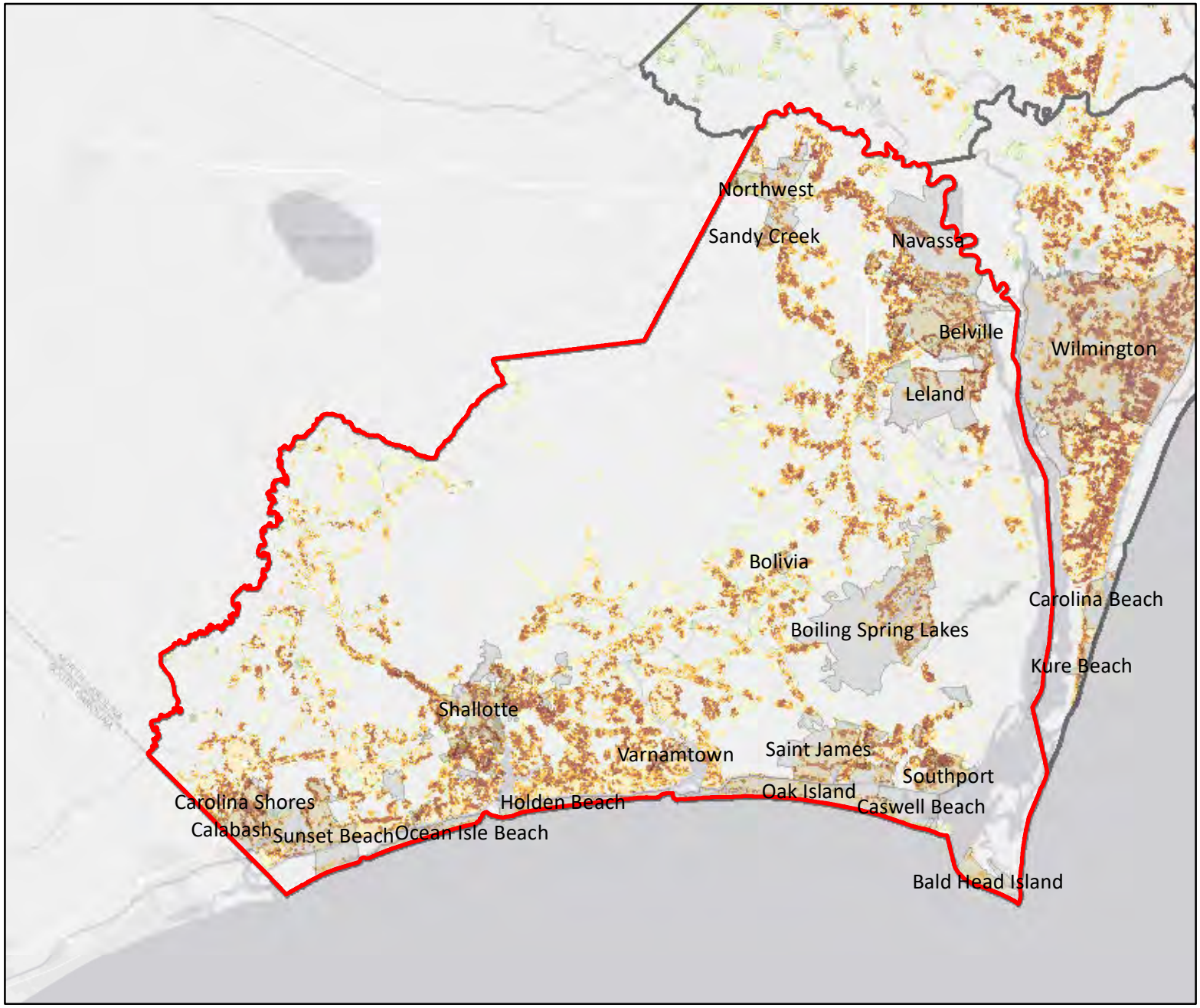
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Brunswick County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

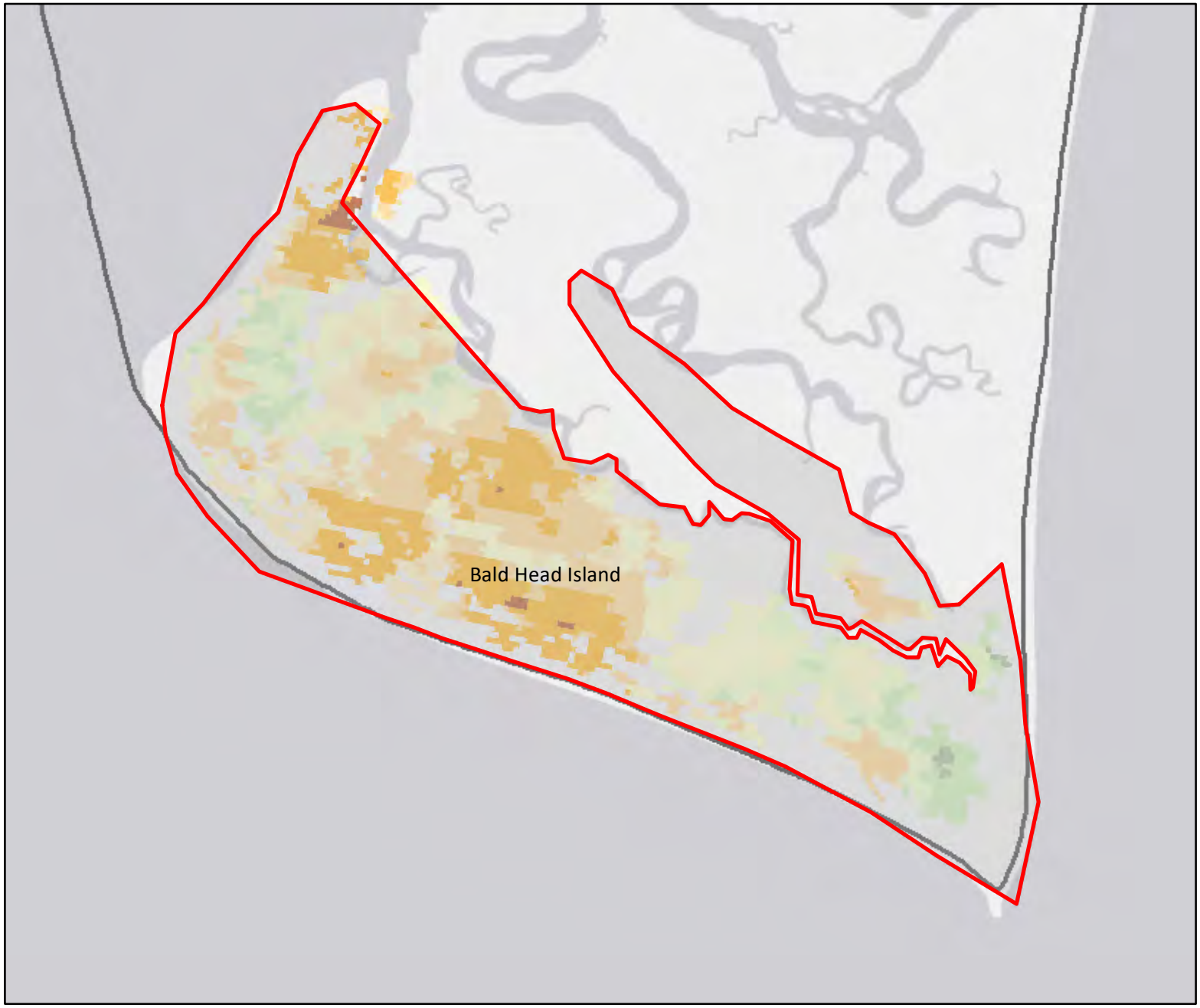
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Bald Head Island - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

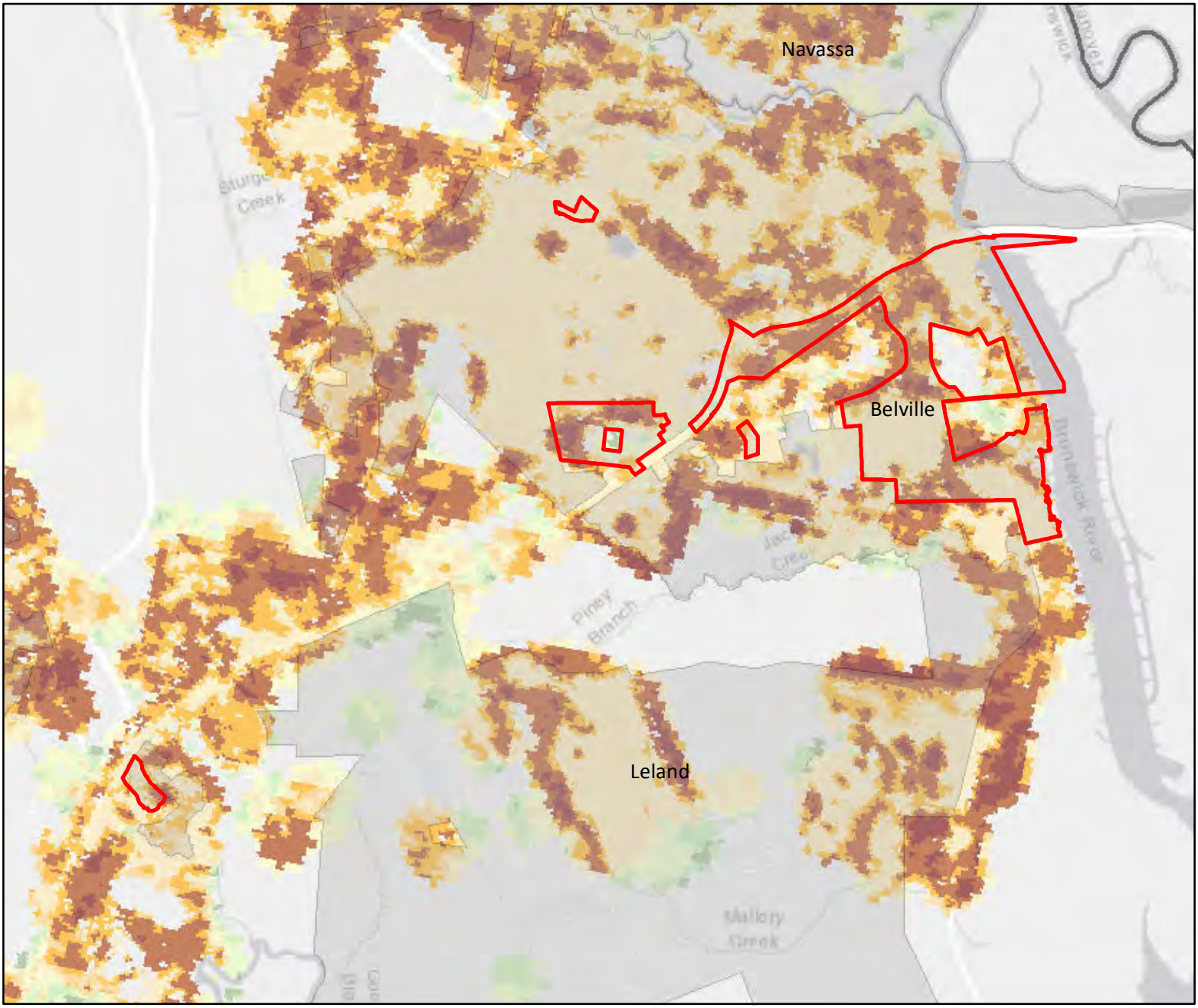
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Belville - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

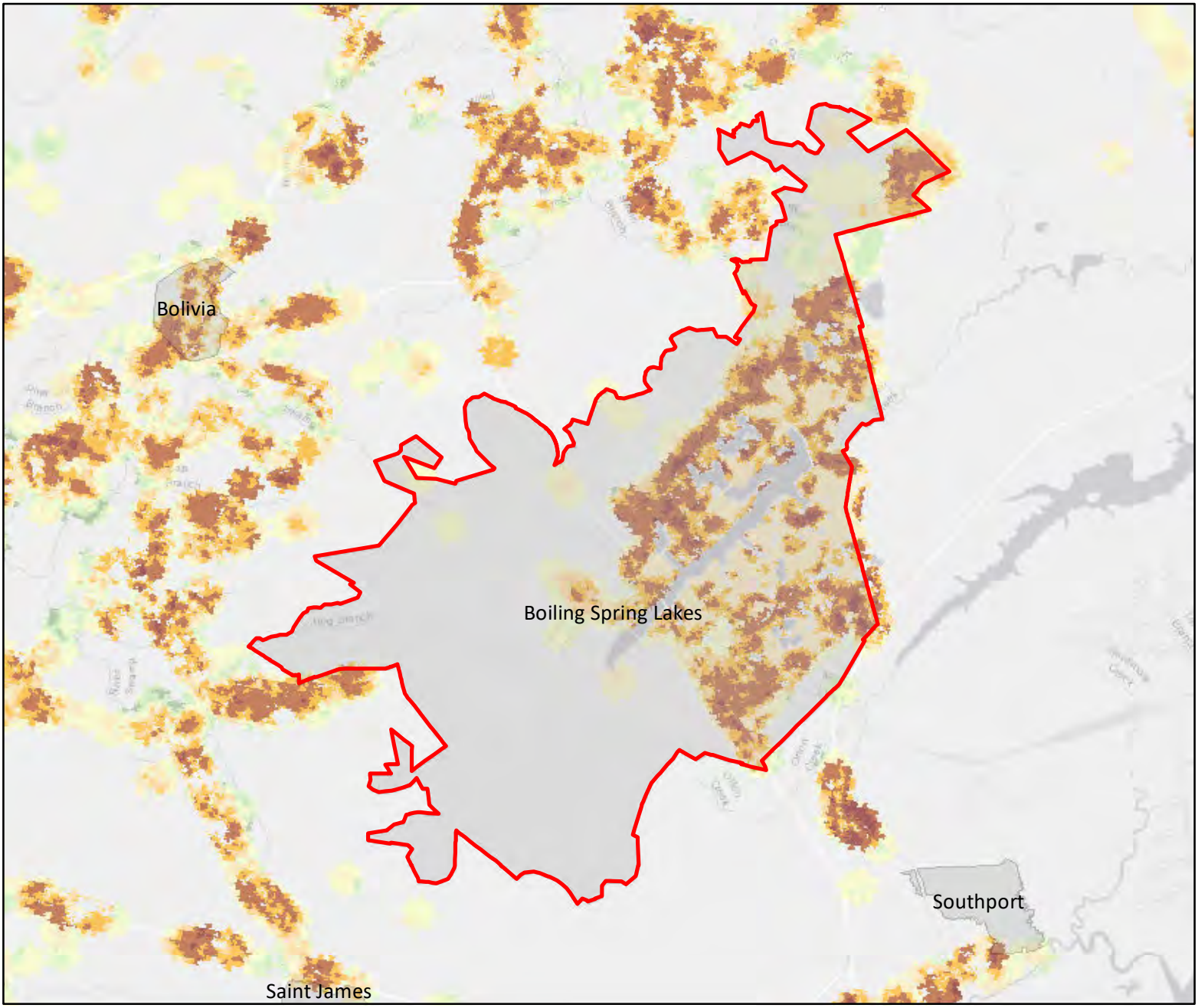
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Boiling Spring Lakes - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

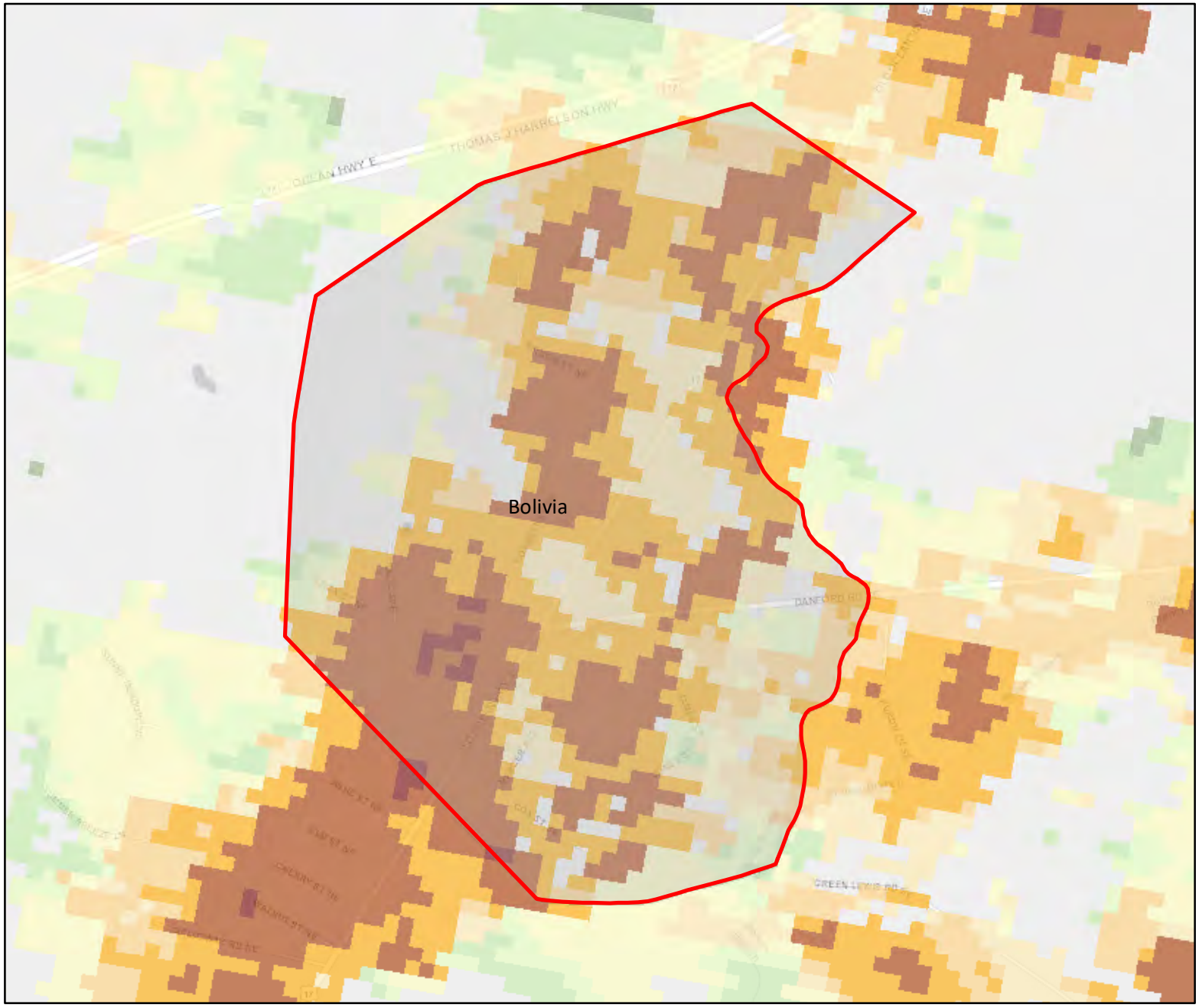
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Bolivia - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

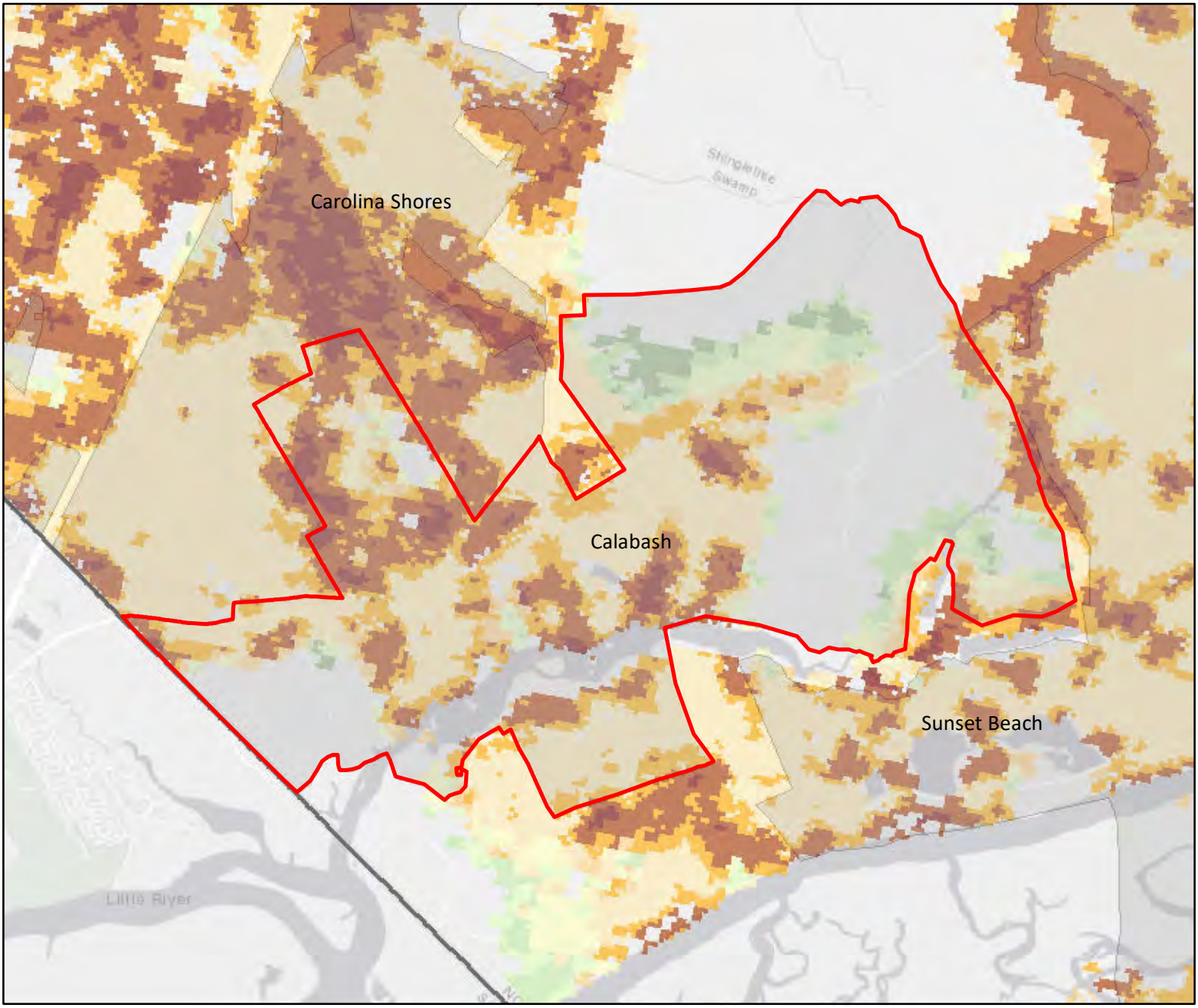
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Calabash - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

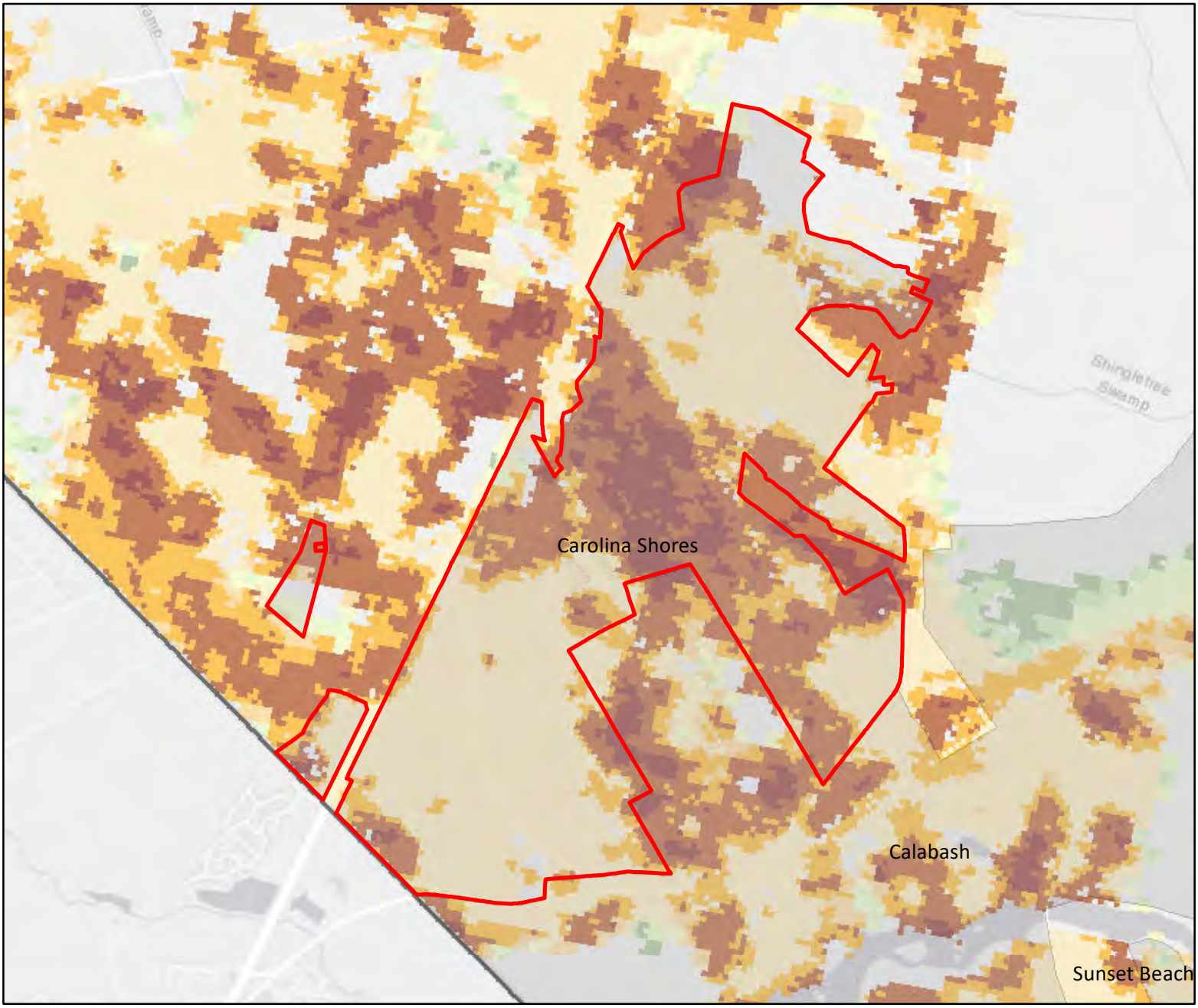
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Carolina Shores - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

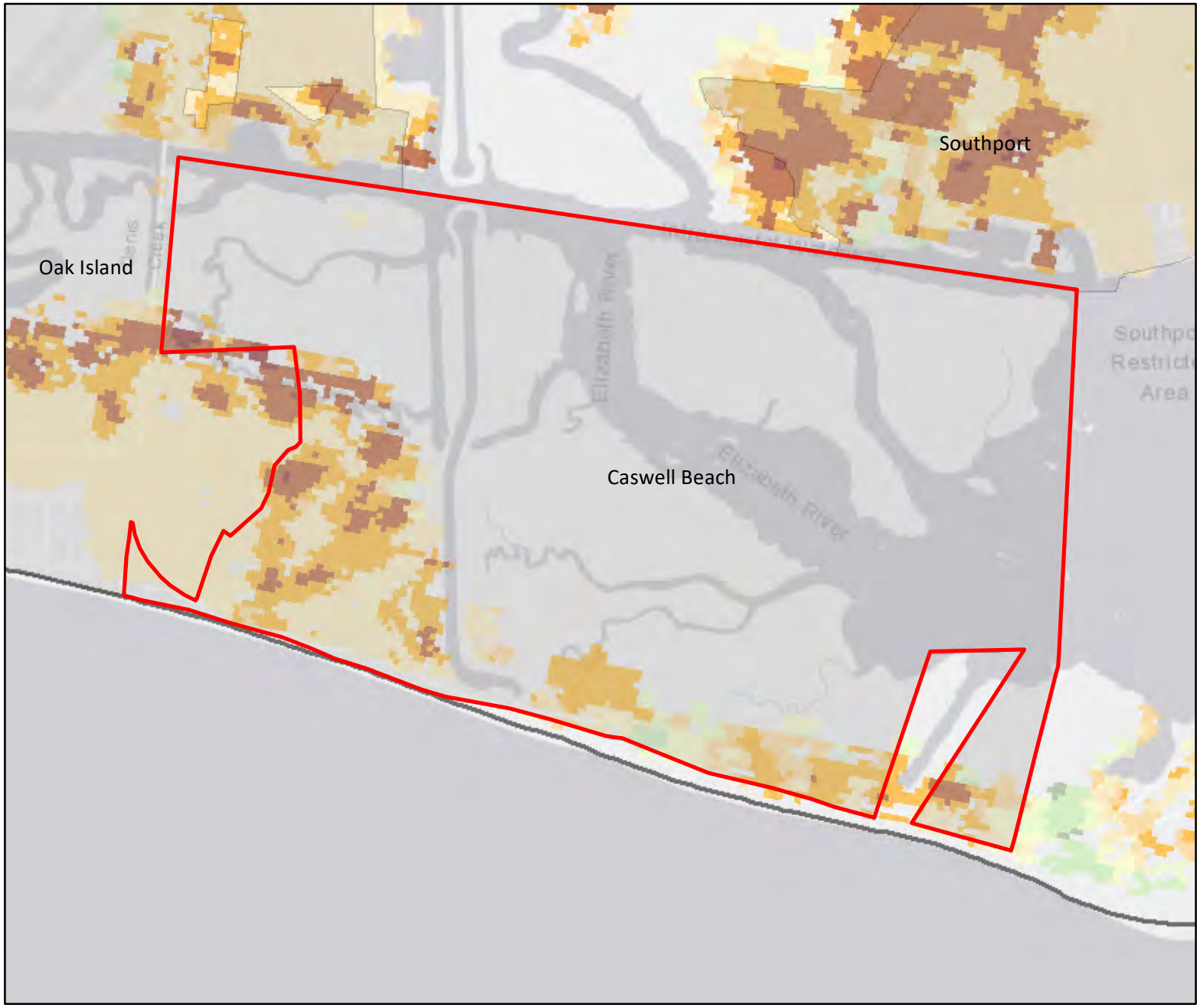
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Caswell Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

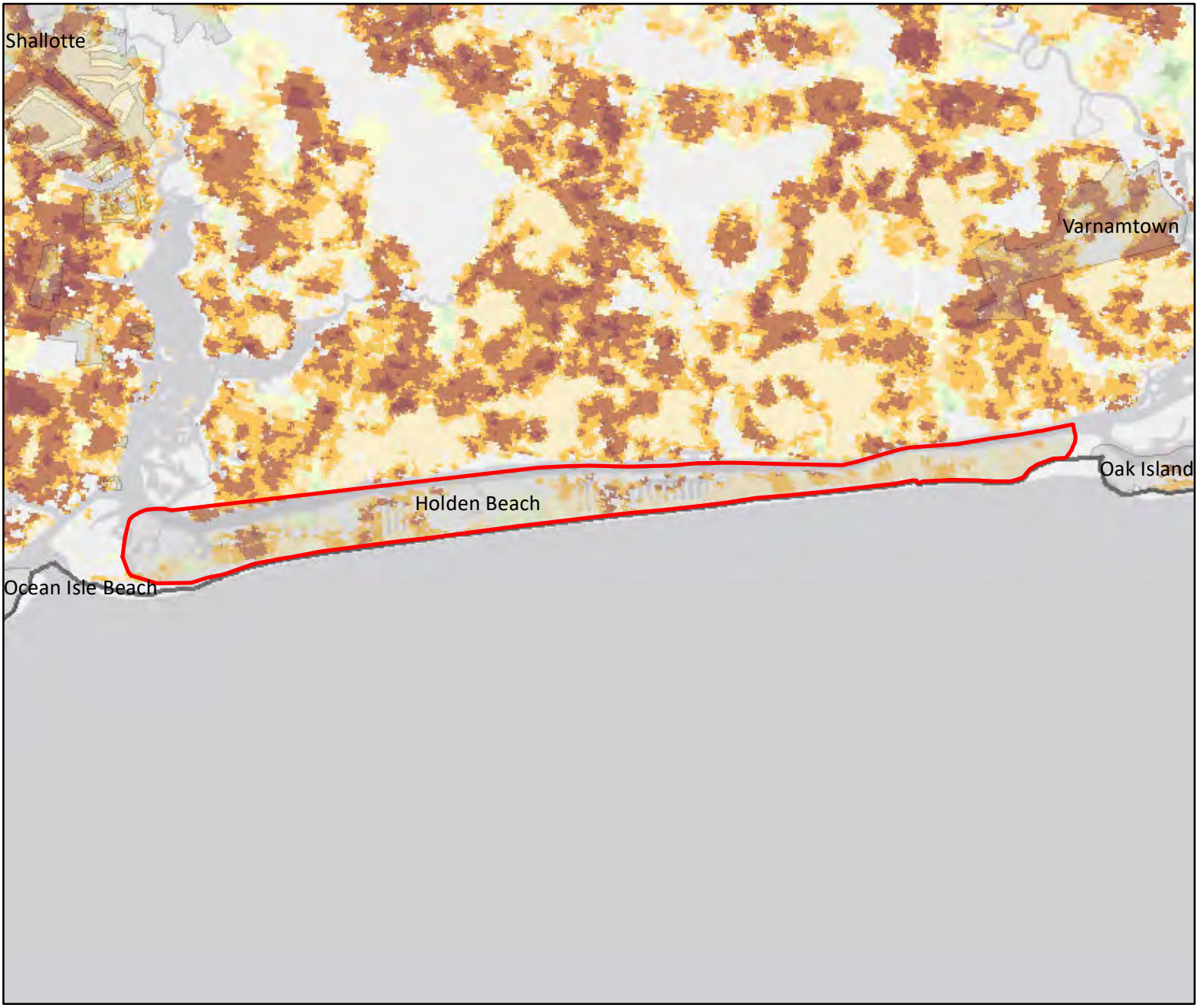
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.275 0.55 1.1 Miles

N

Holden Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

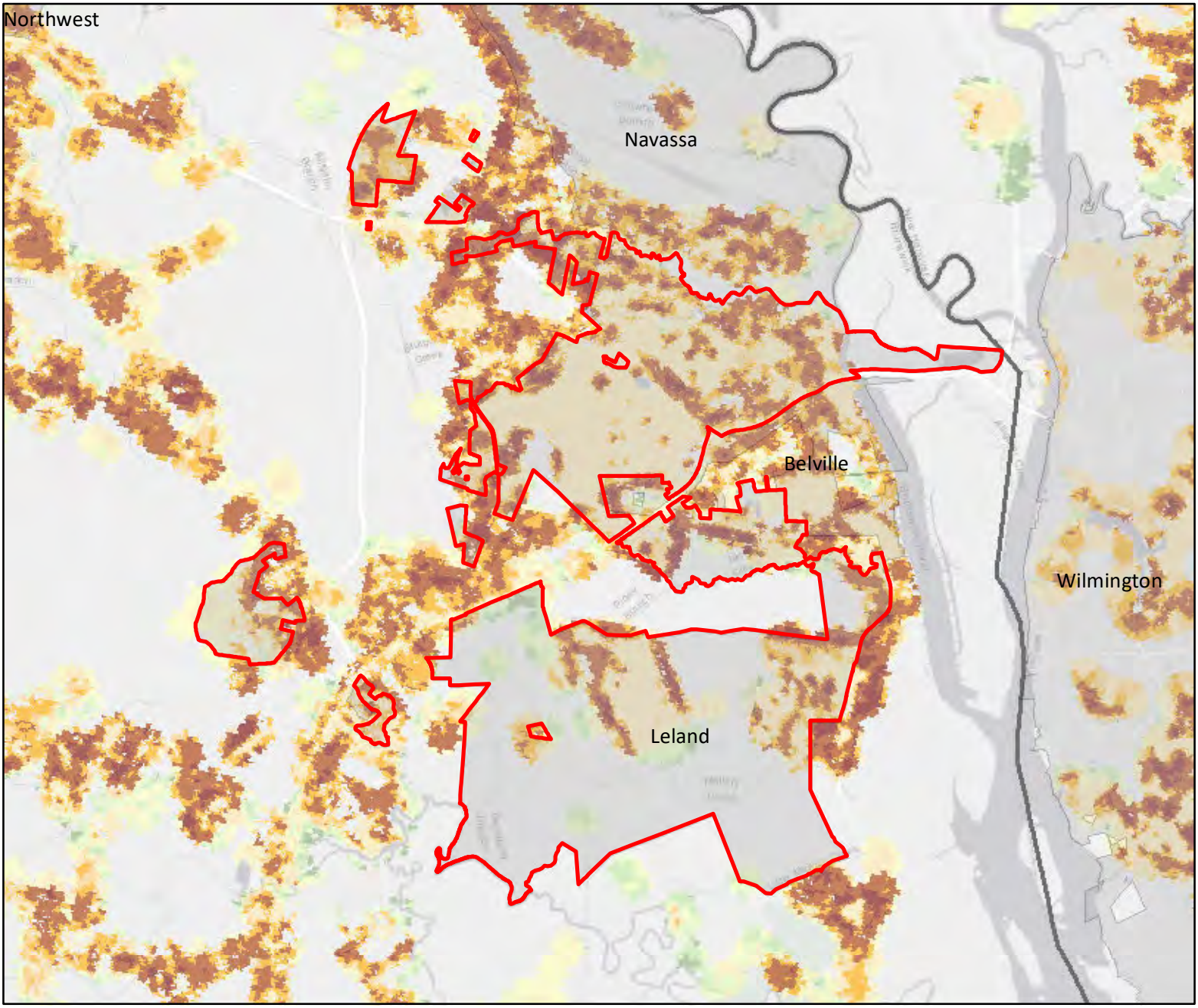
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Leland - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

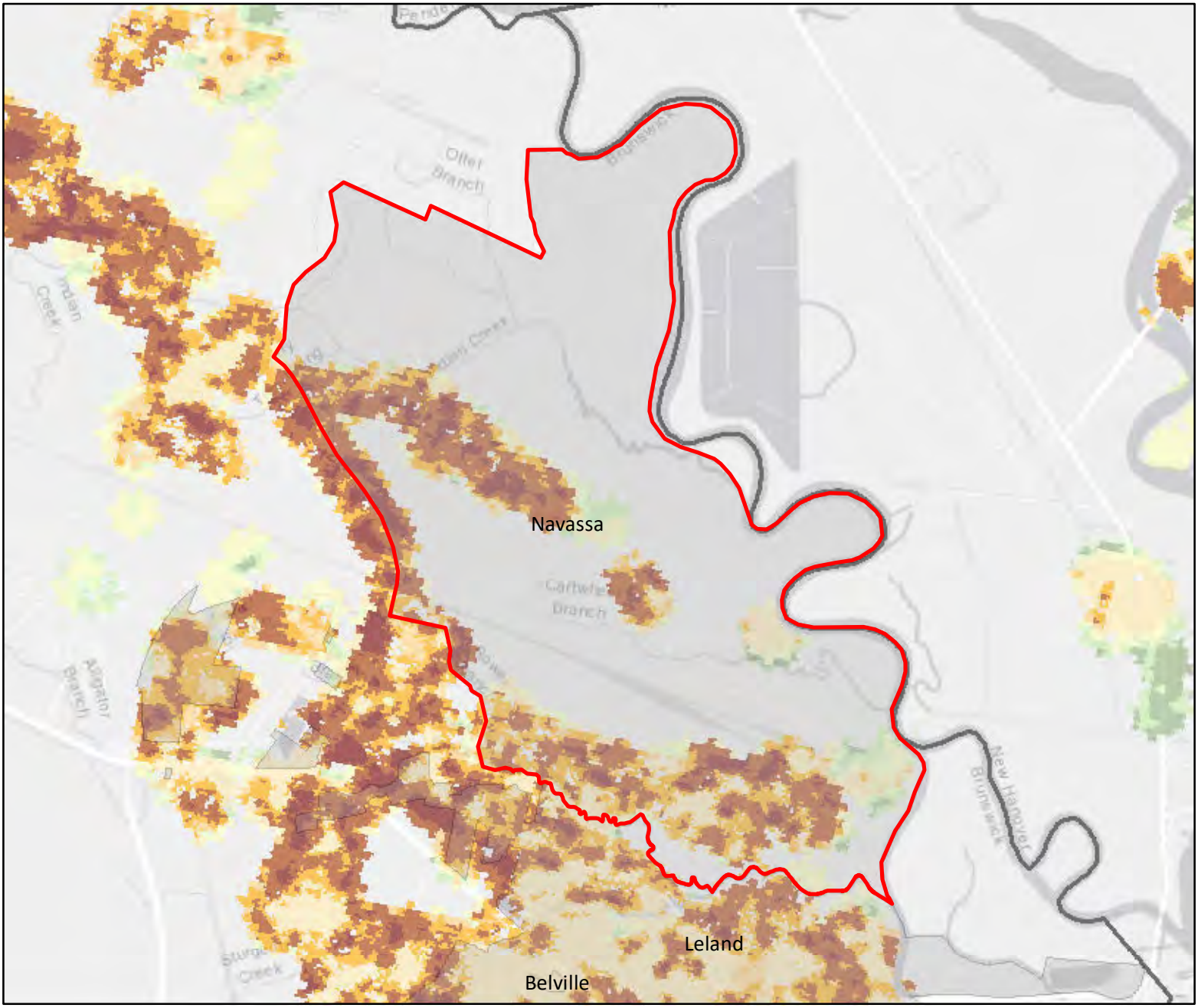
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Navassa - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

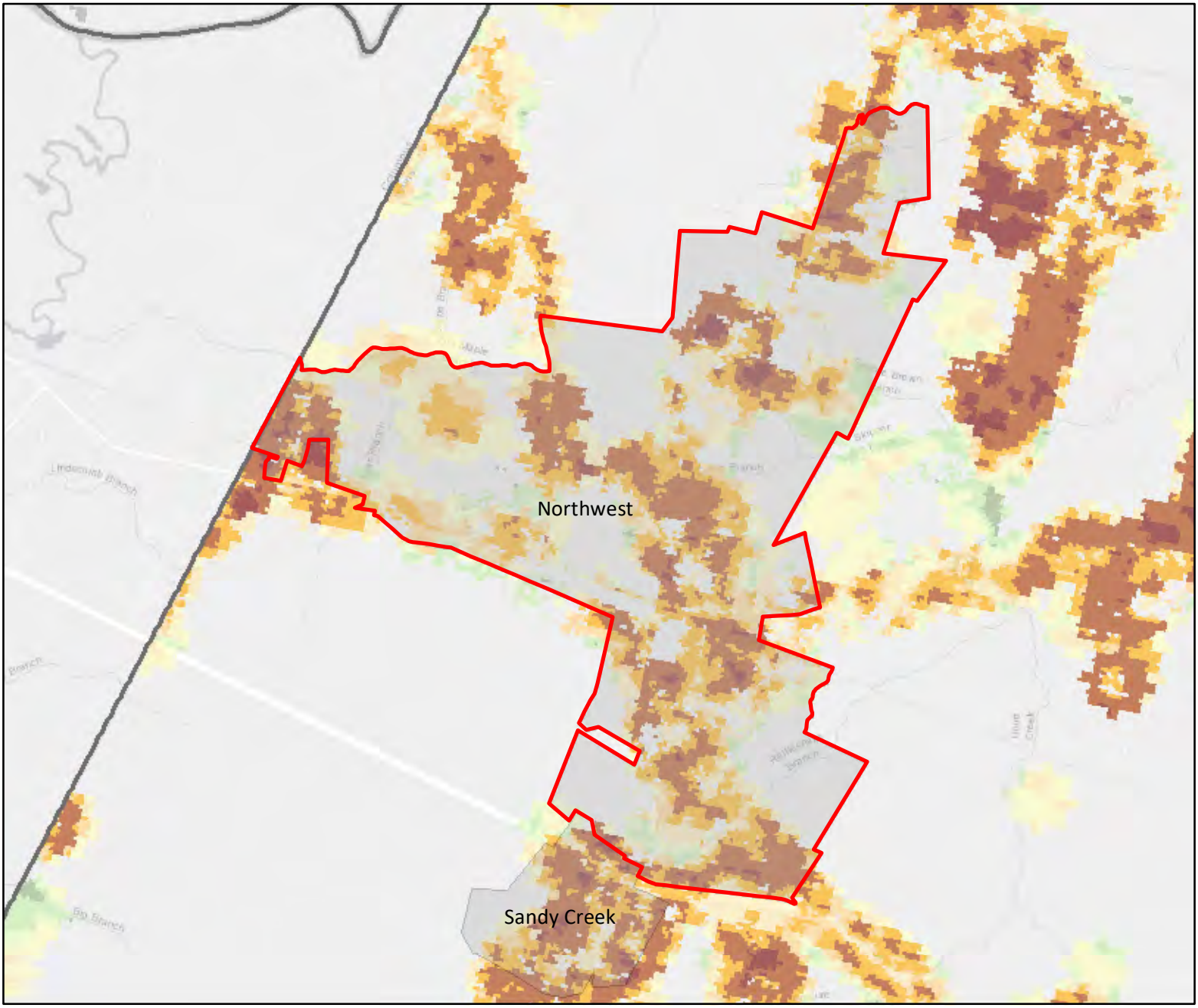
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Northwest - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Oak Island - Wildland Urban Interface Risk Index

Legend

Municipal Boundary

County Boundary

WUI Risk Index

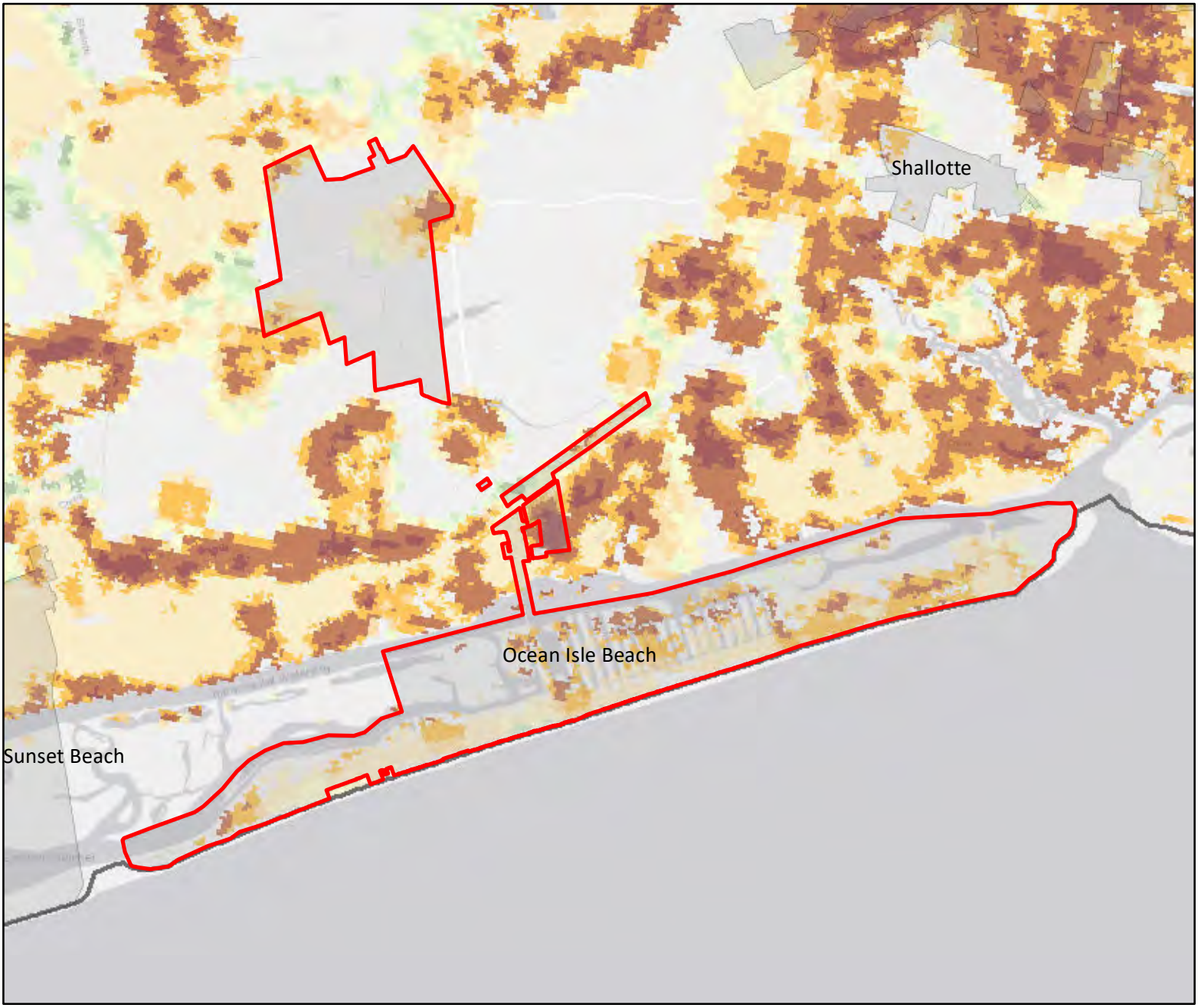
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Ocean Isle Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

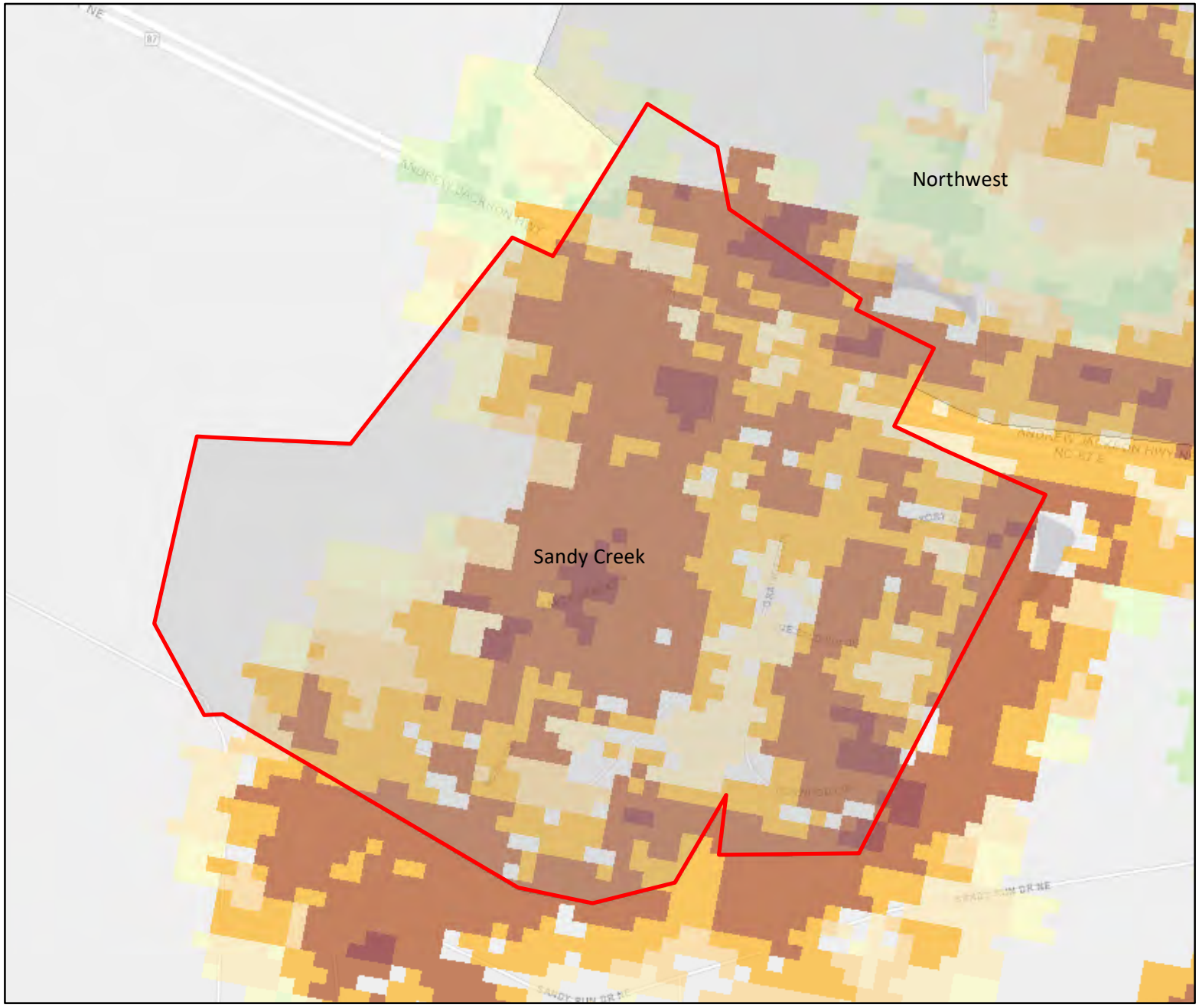
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Sandy Creek - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

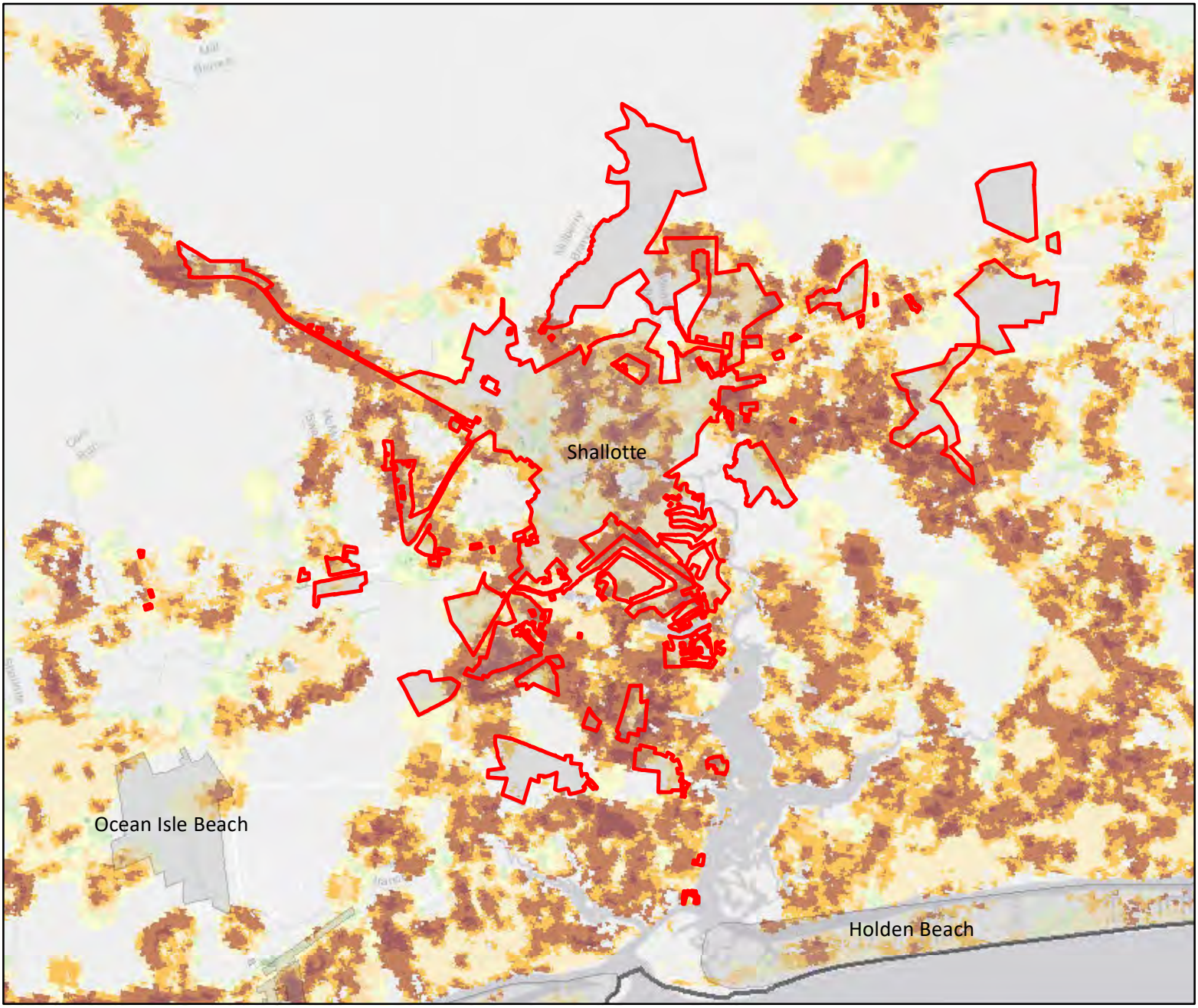
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.1 0.2 0.4 Miles

N

Shallotte - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

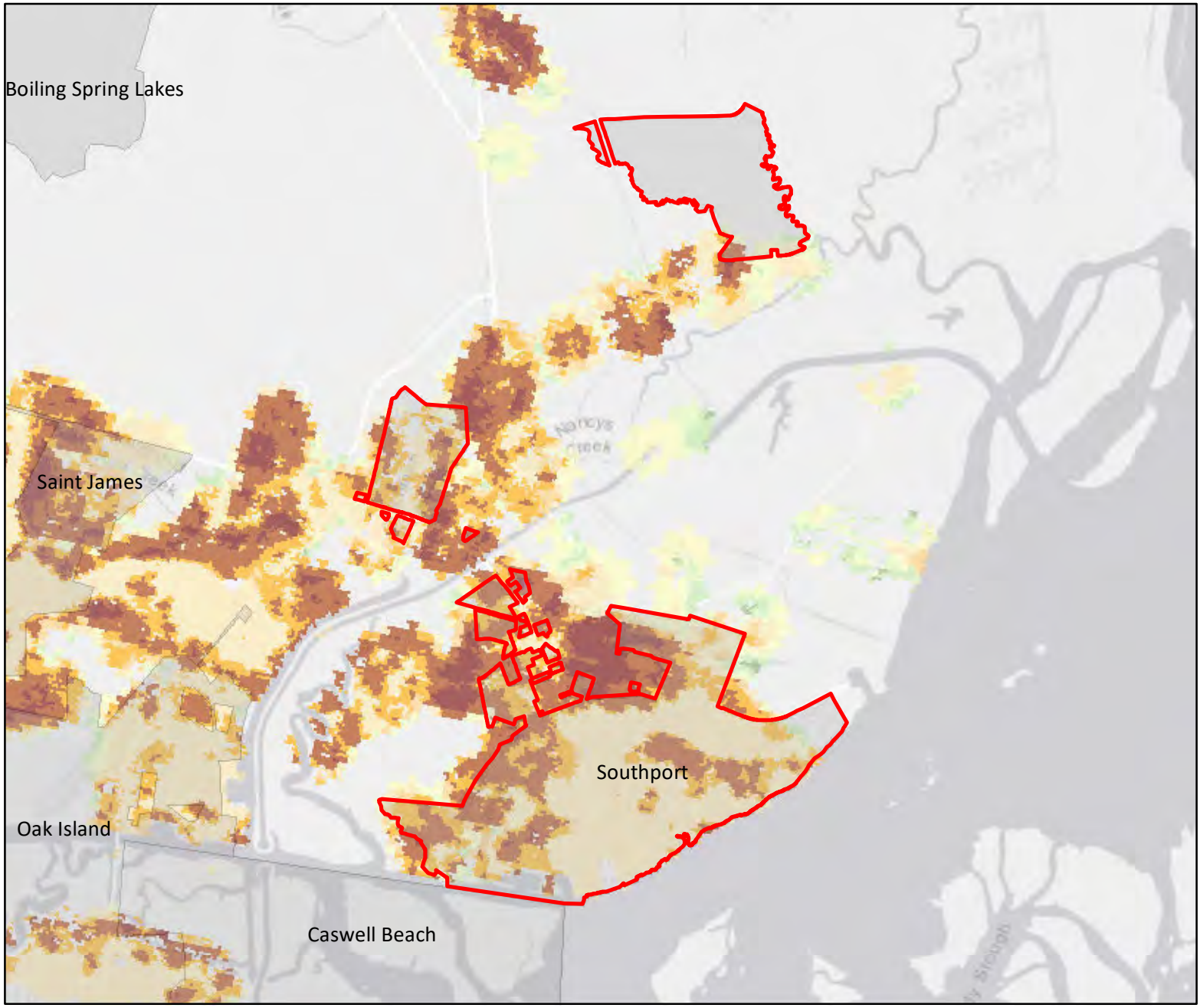
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

Southport - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

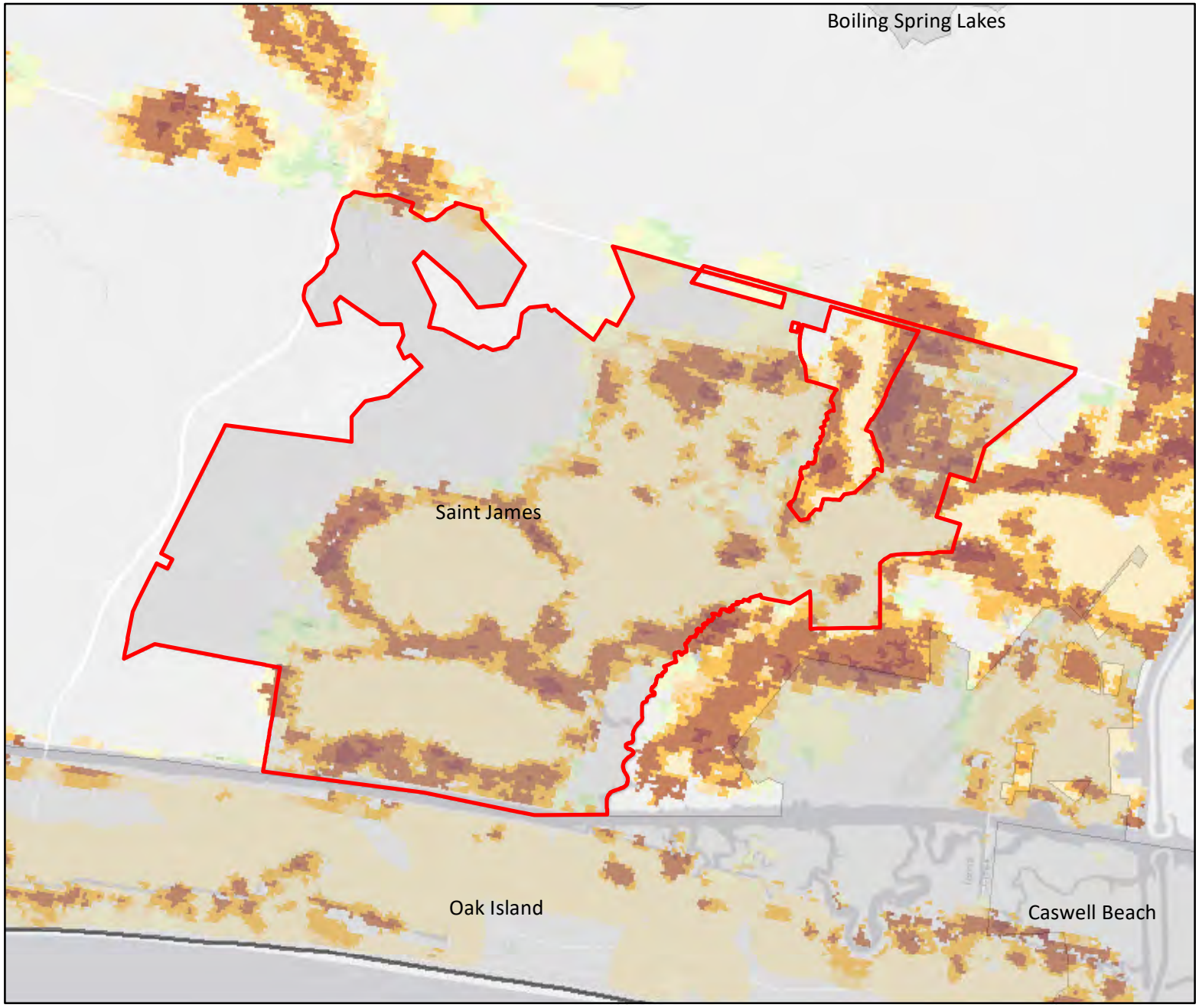
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Saint James - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

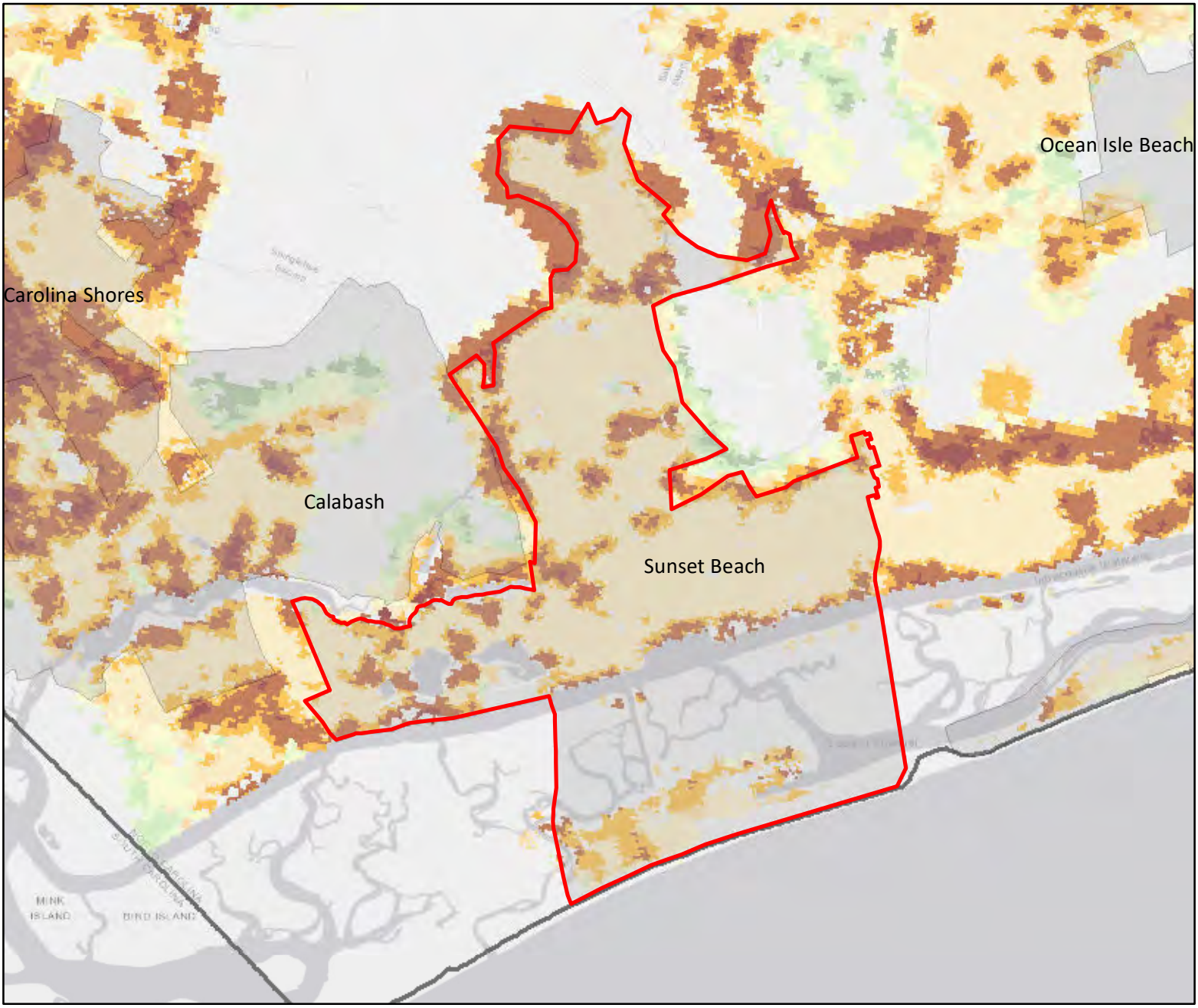
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.45 0.9 1.8 Miles

N

Sunset Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

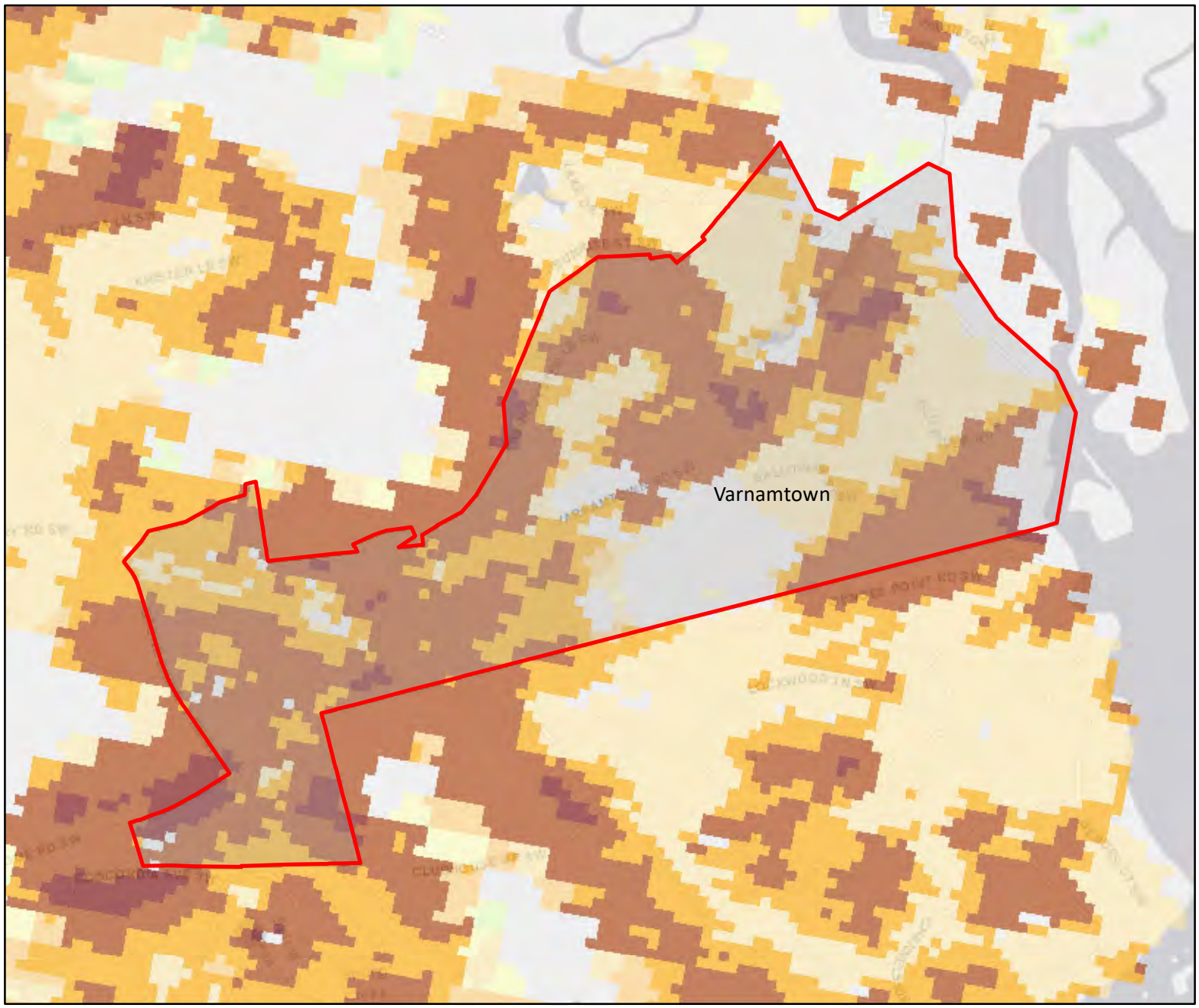
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Varnamtown - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

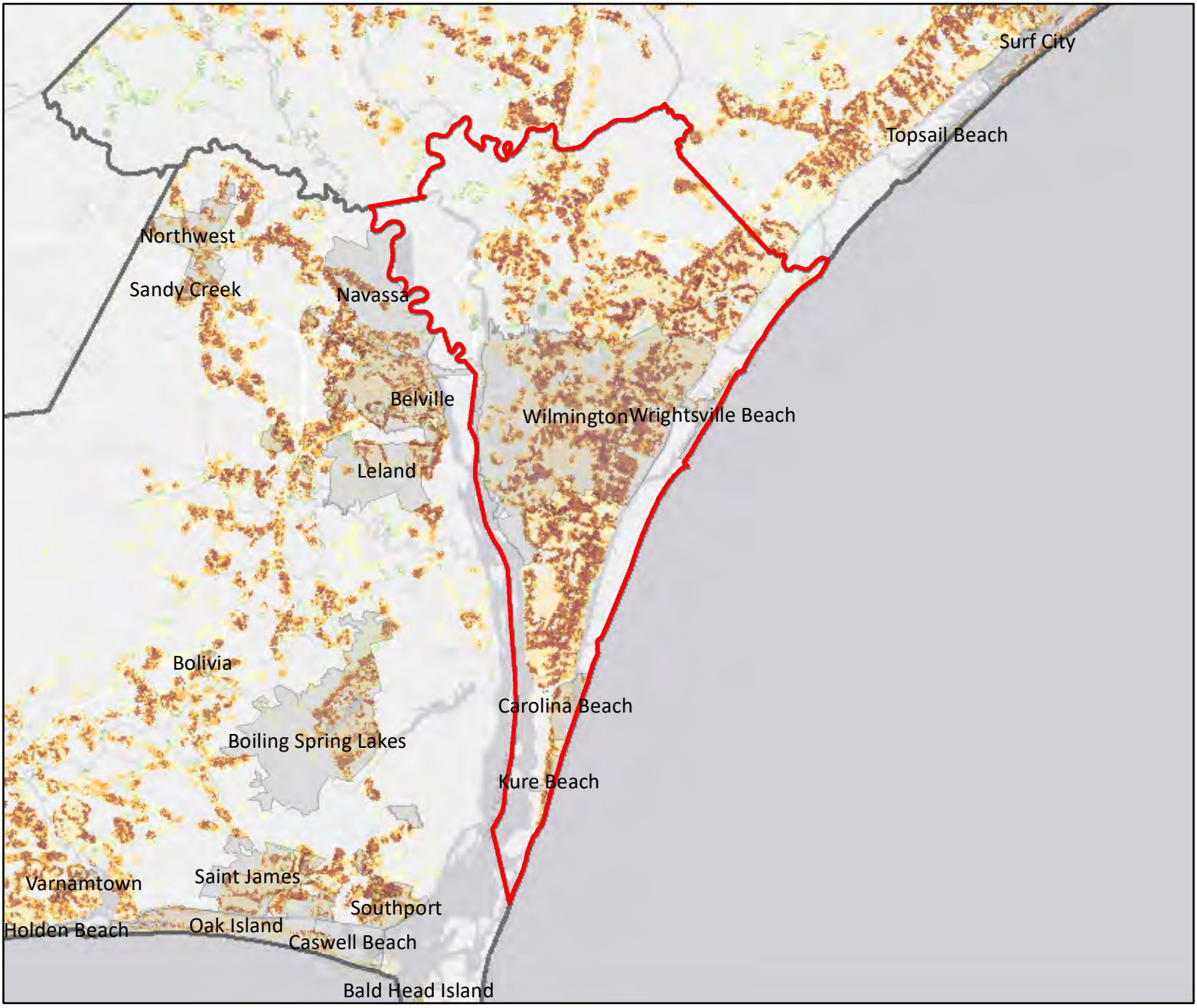
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

New Hanover County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

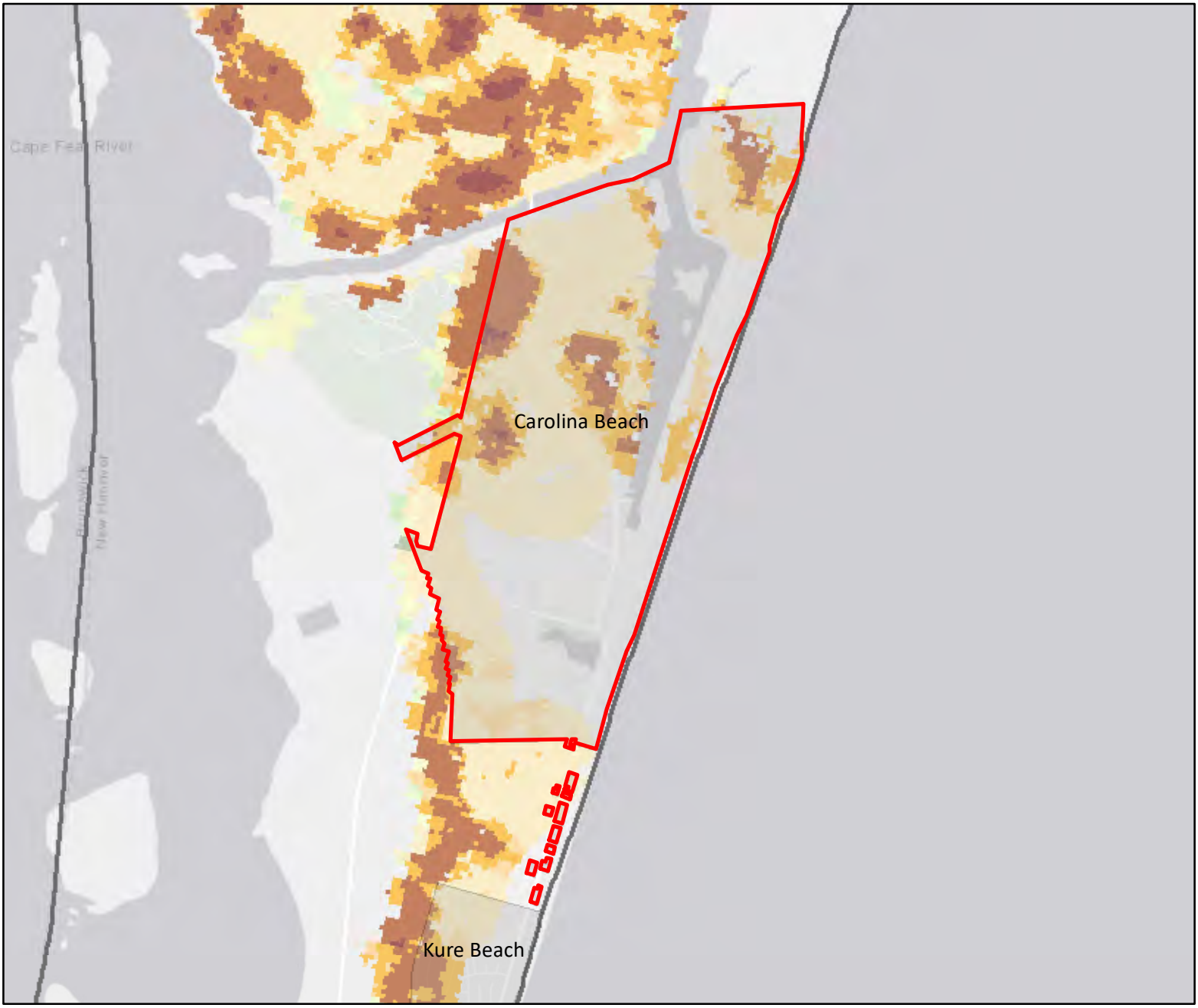
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.5 7 14 Miles

N

Carolina Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

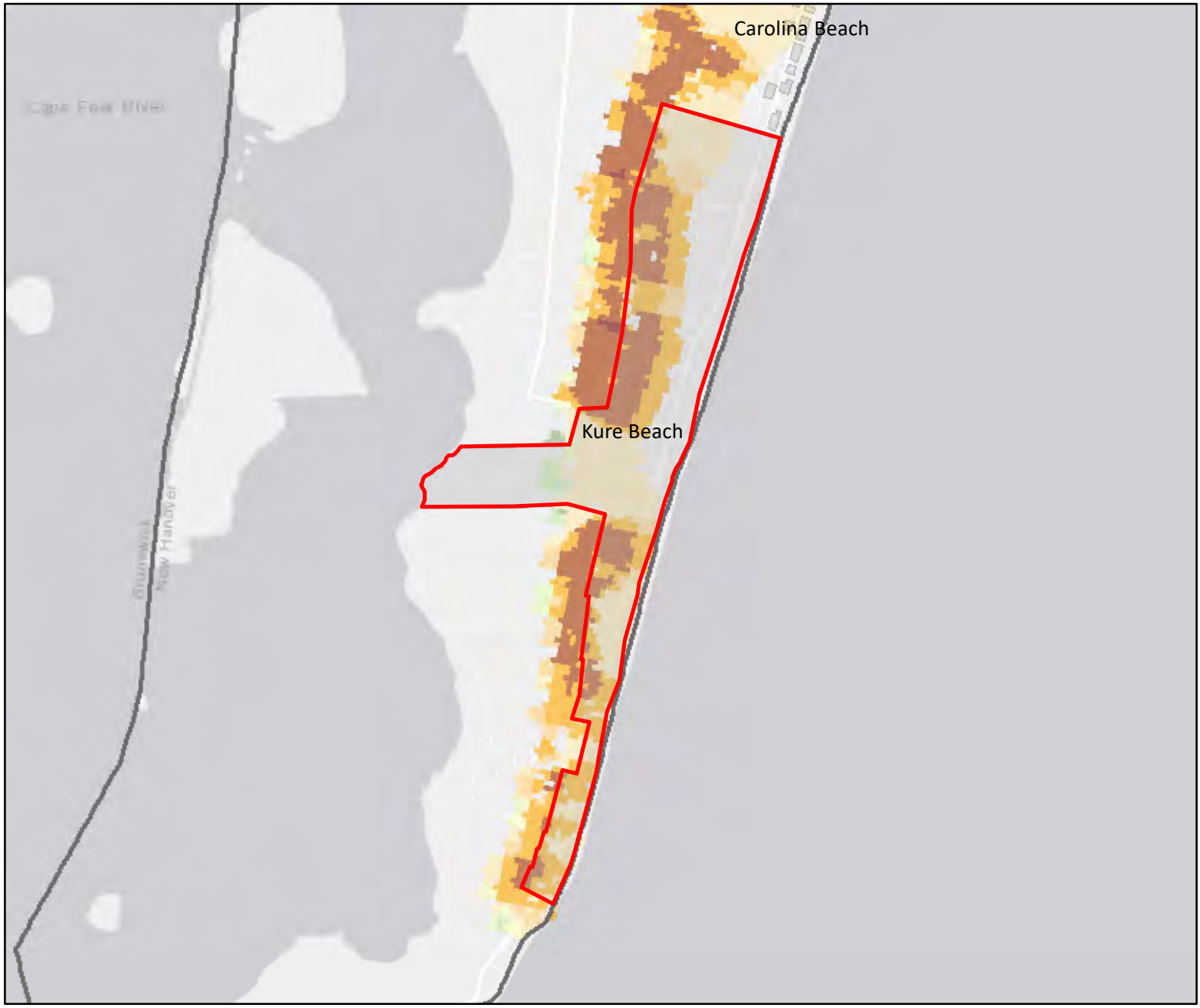
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Kure Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

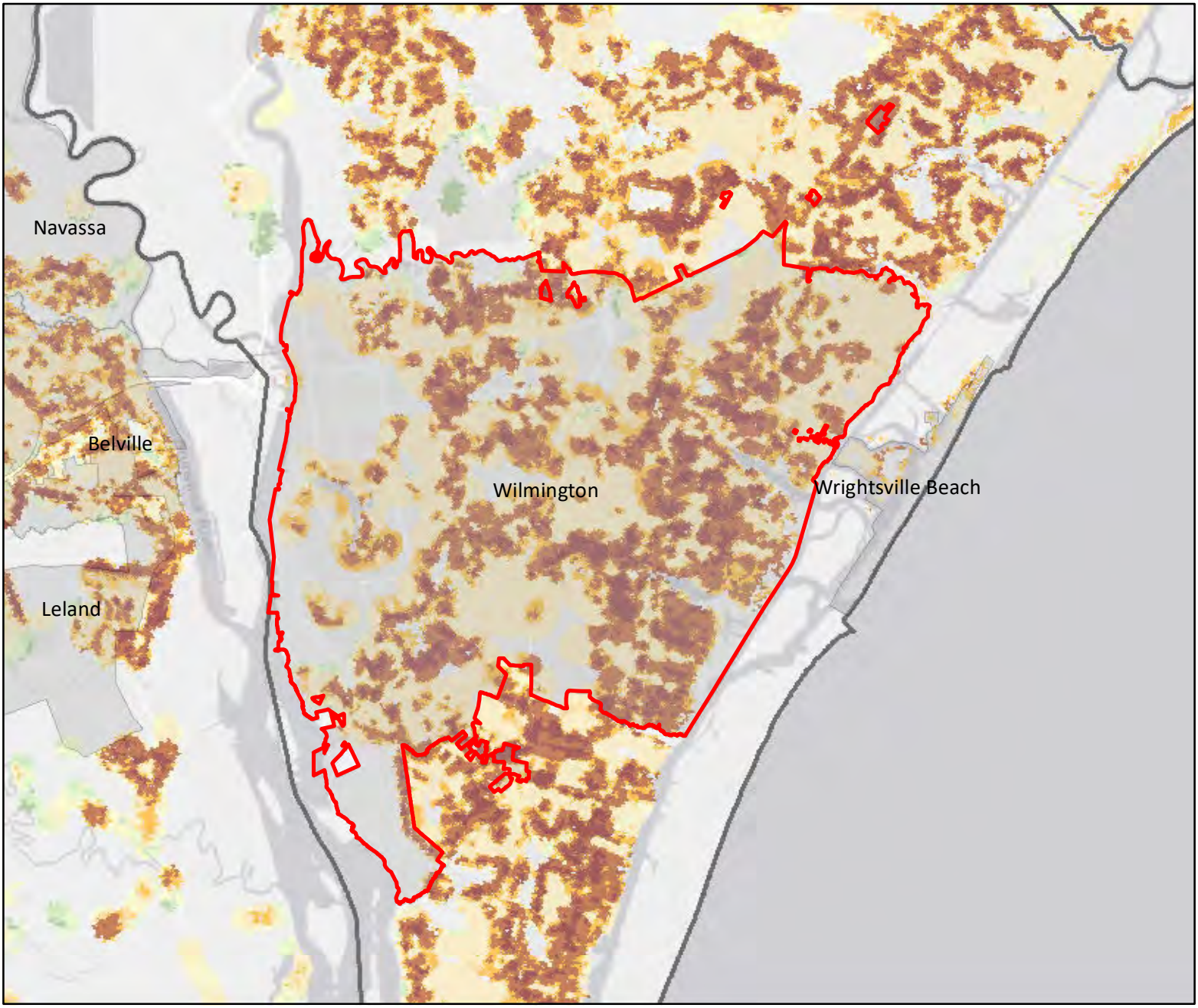
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.3 0.6 1.2 Miles

N

Wilmington - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 1.25 2.5 5 Miles

N

Wrightsville Beach - Wildland Urban Interface Risk Index

Legend

Municipal Boundary

County Boundary

WUI Risk Index

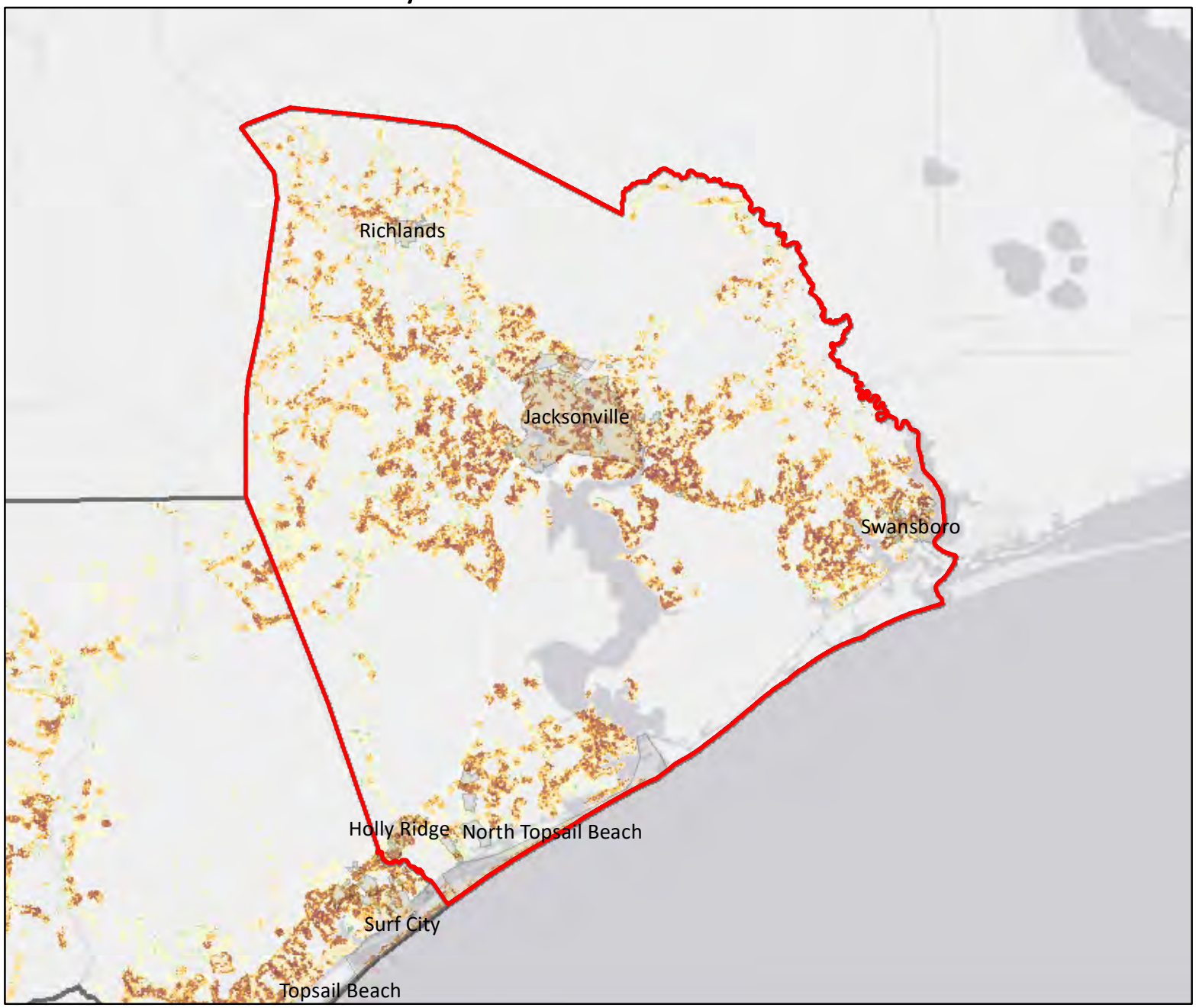
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.4 0.8 1.6 Miles

N

Onslow County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

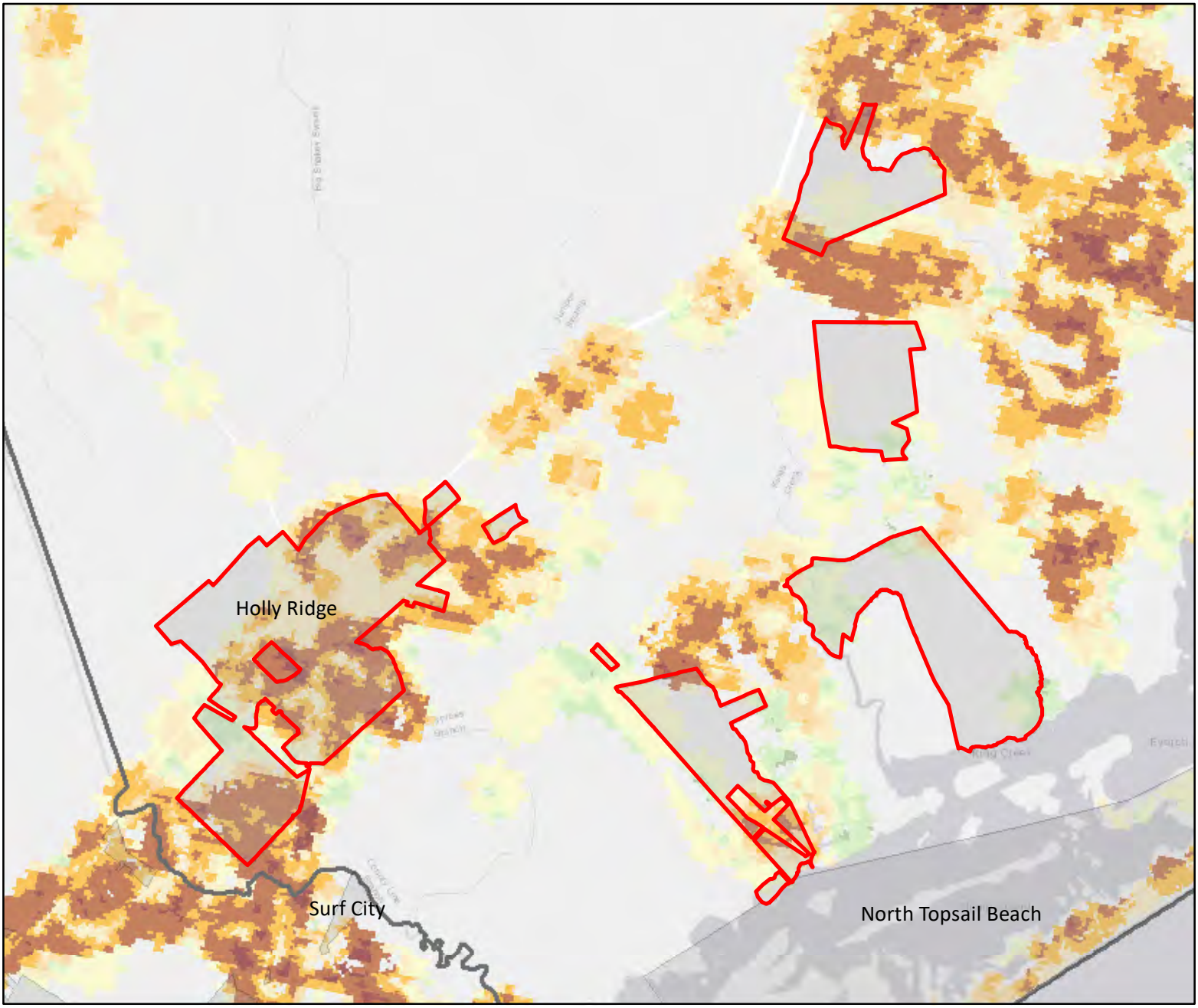
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Holly Ridge - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

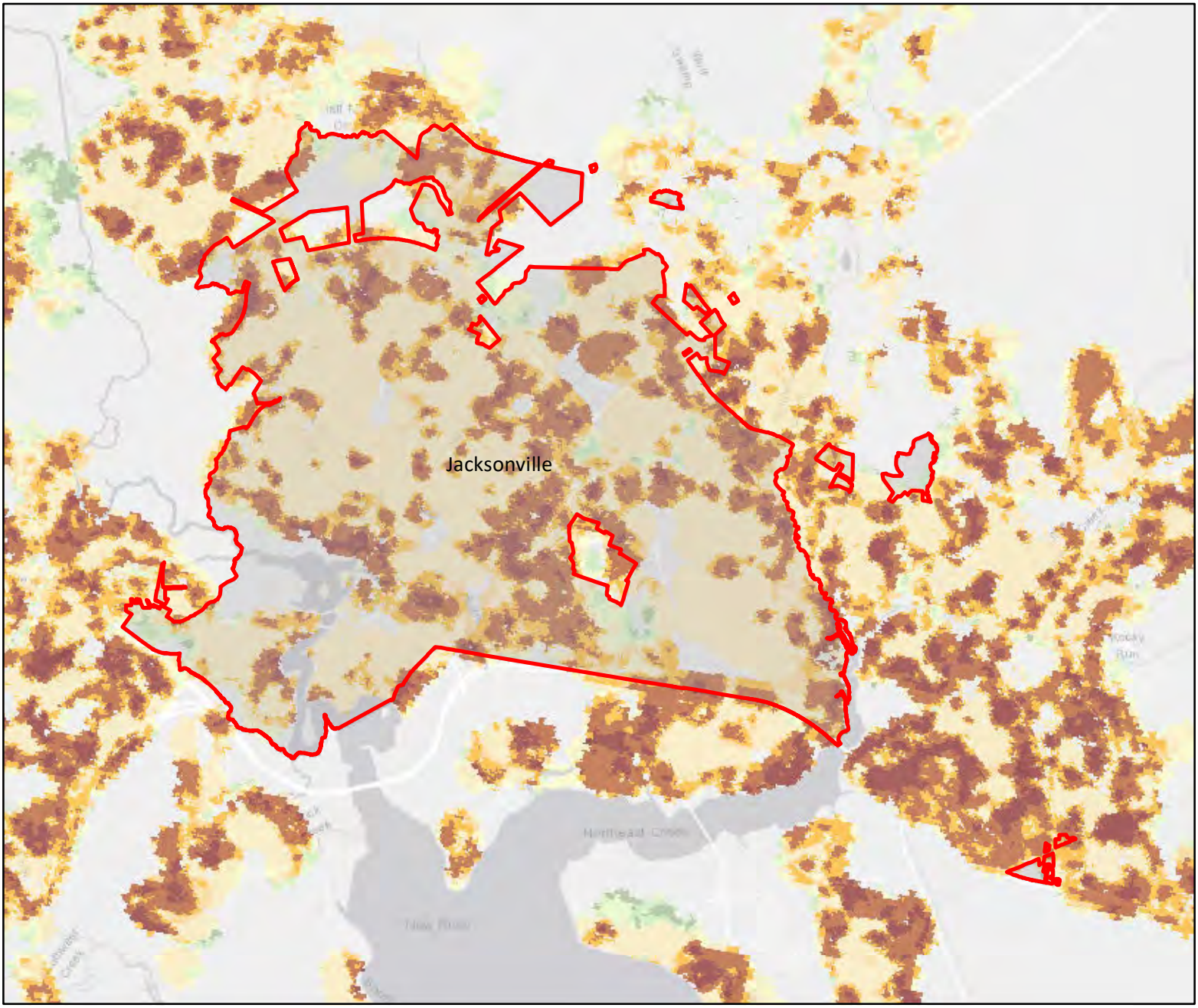
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Jacksonville - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

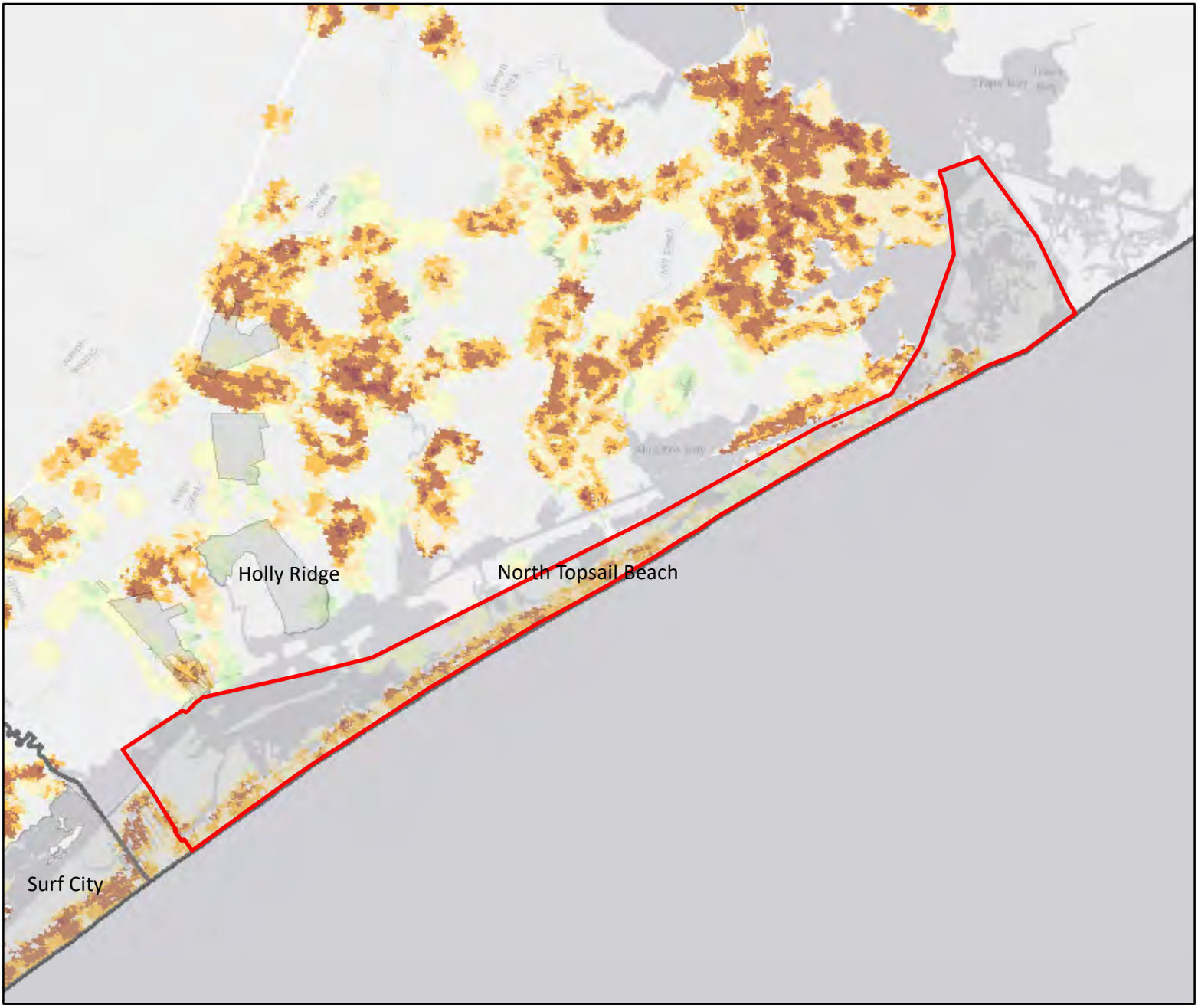
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.75 1.5 3 Miles

N

North Topsail Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

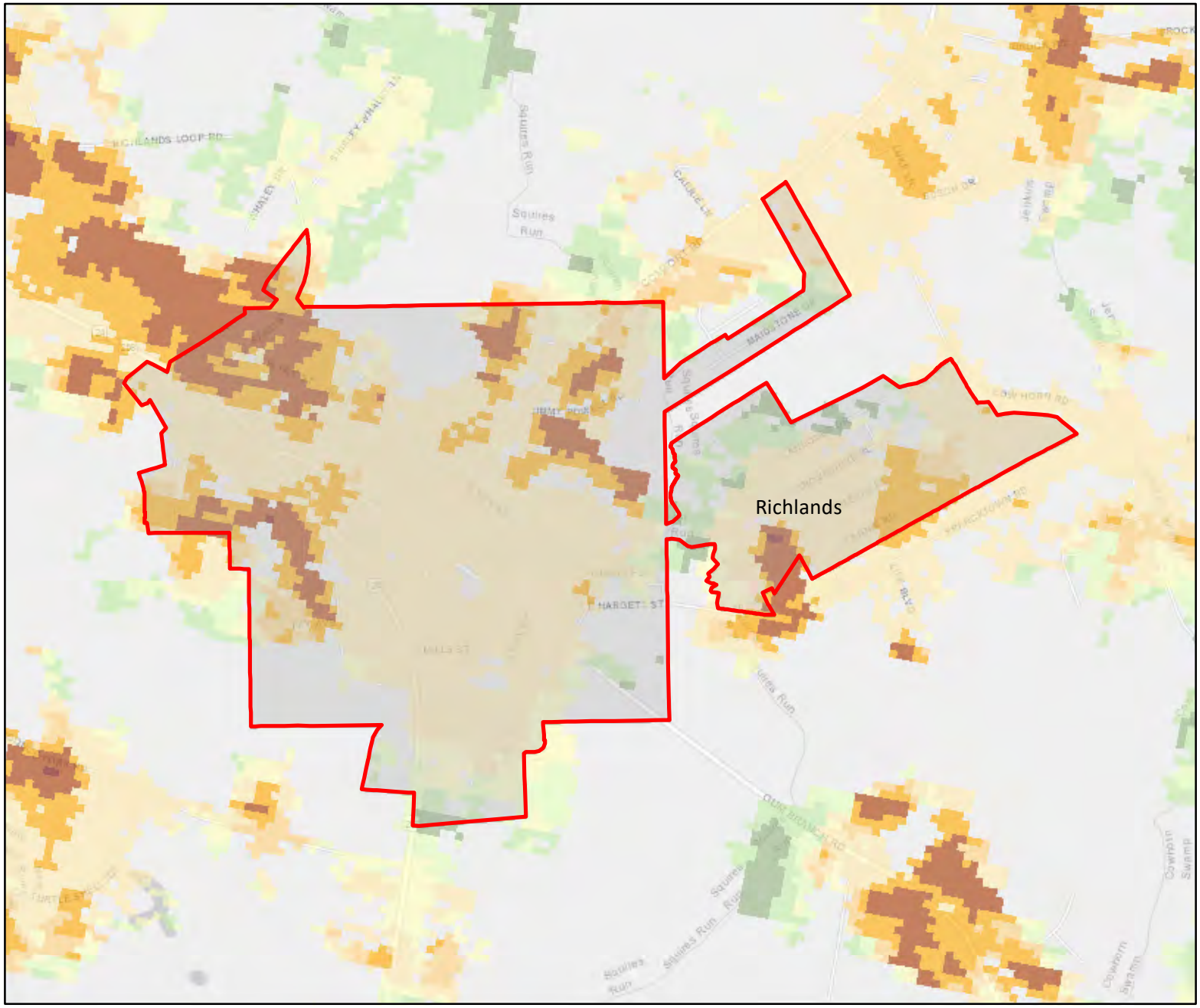
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 1 2 4 Miles

N

Richlands - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

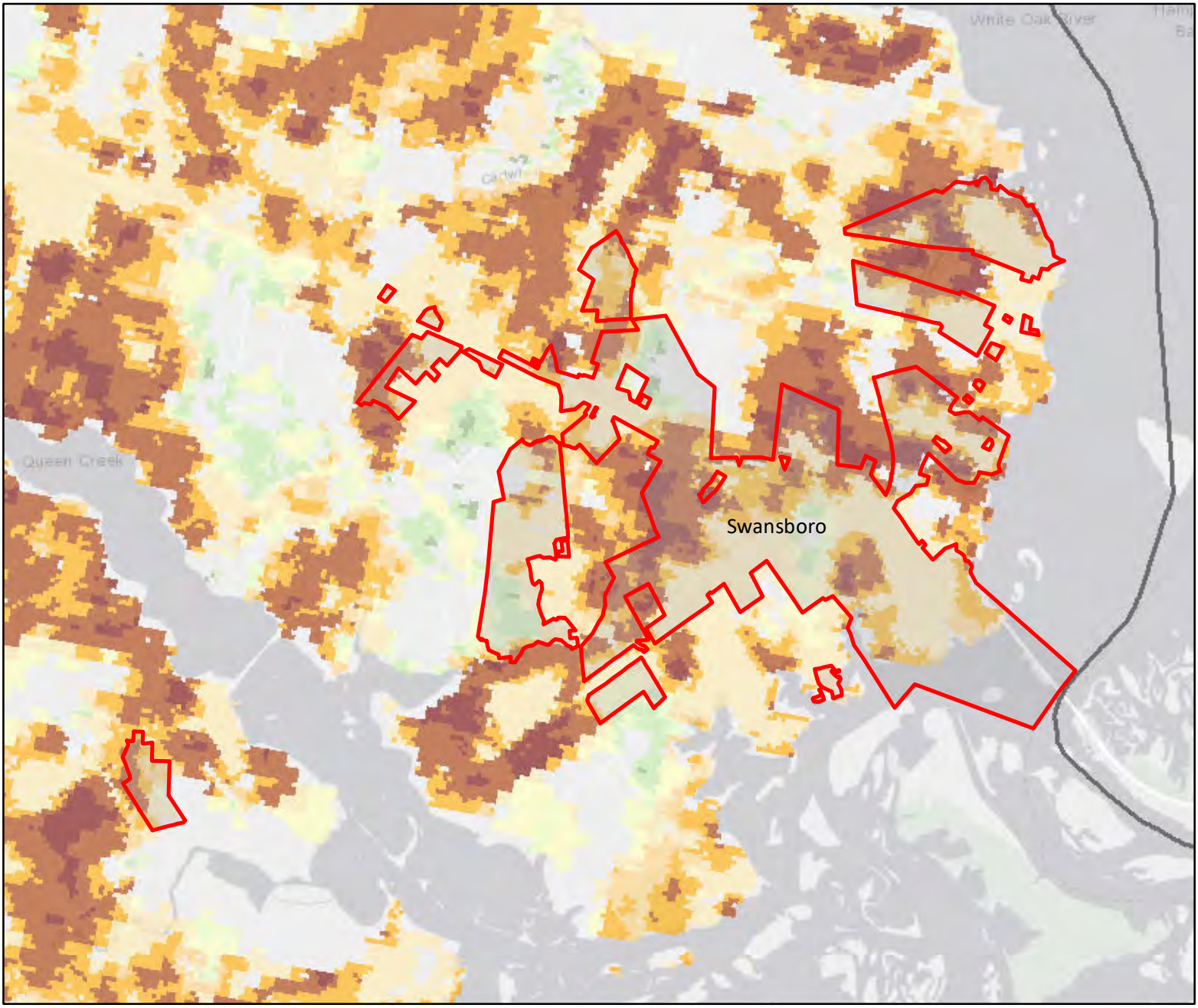
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.2 0.4 0.8 Miles

N

Swansboro - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

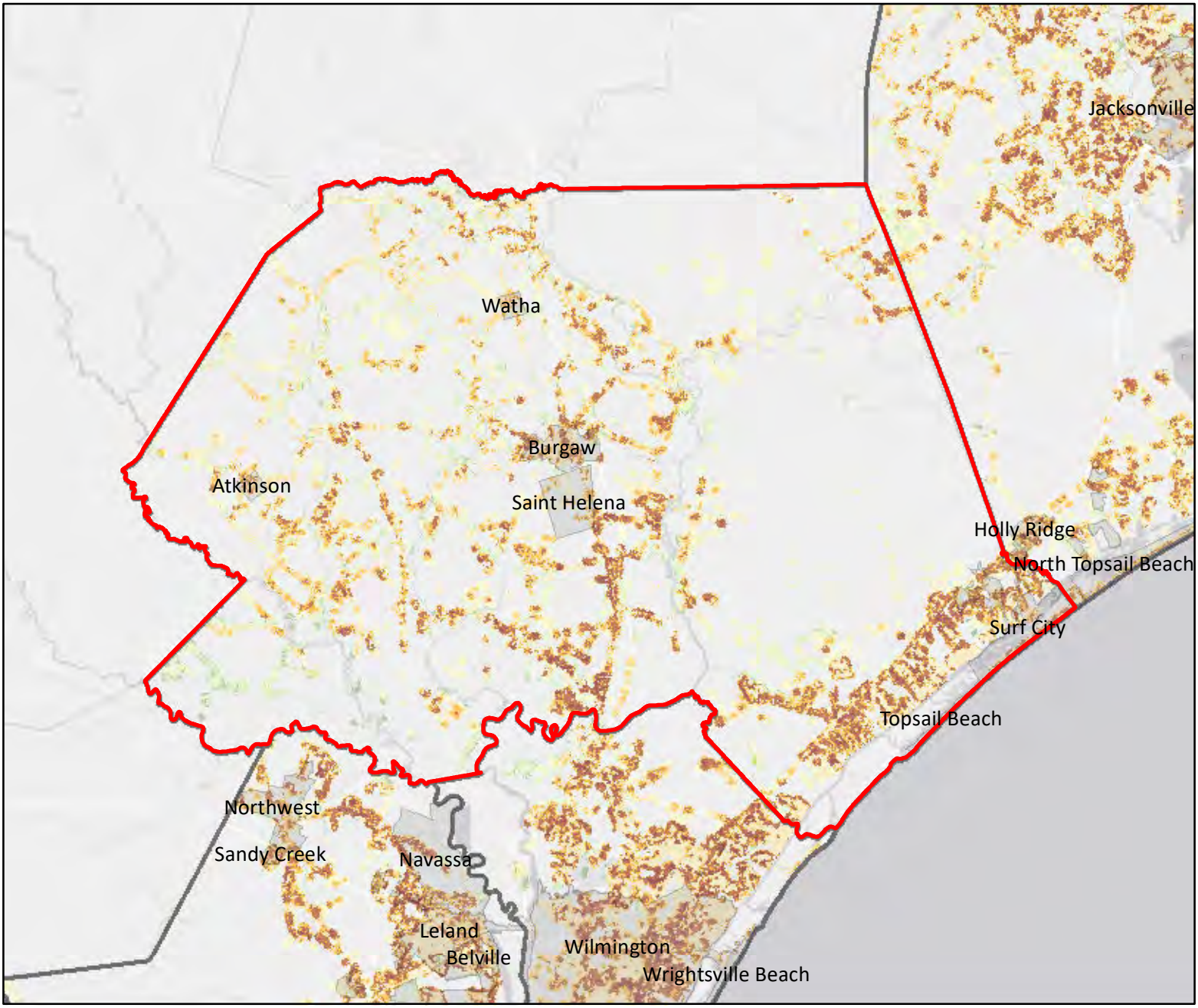
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Pender County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

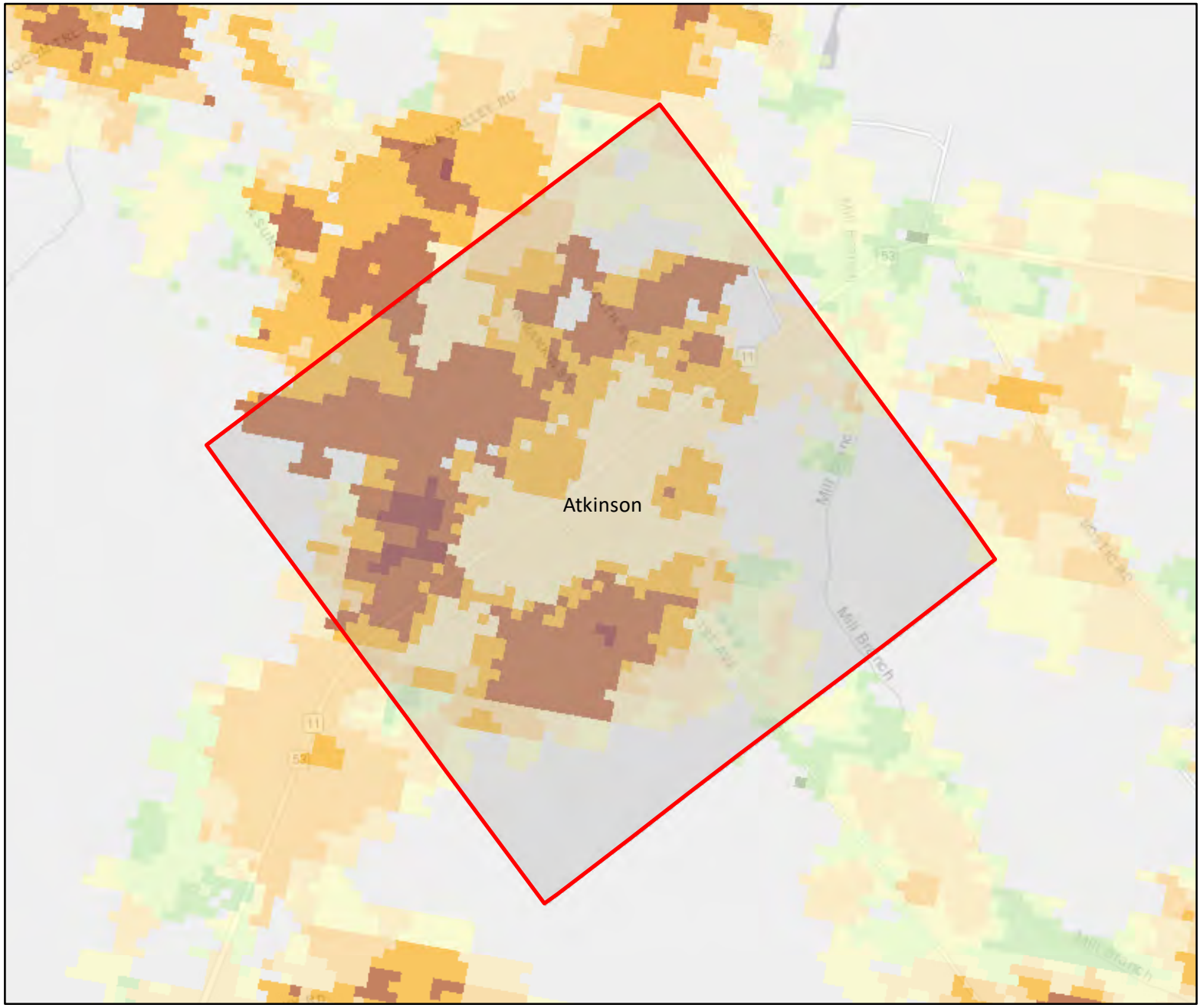
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 4 8 16 Miles

N

Atkinson - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

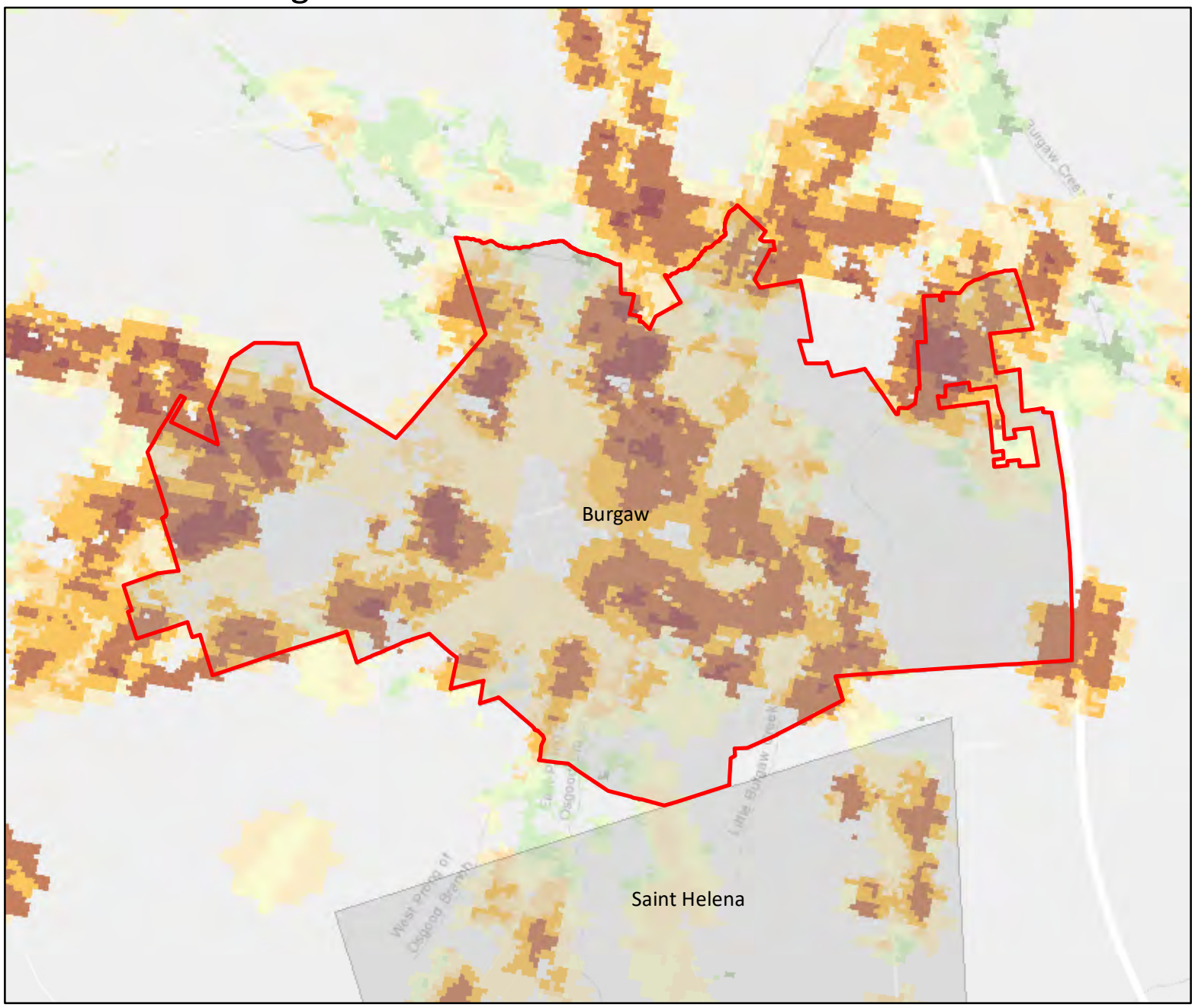
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.15 0.3 0.6 Miles

N

Burgaw - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

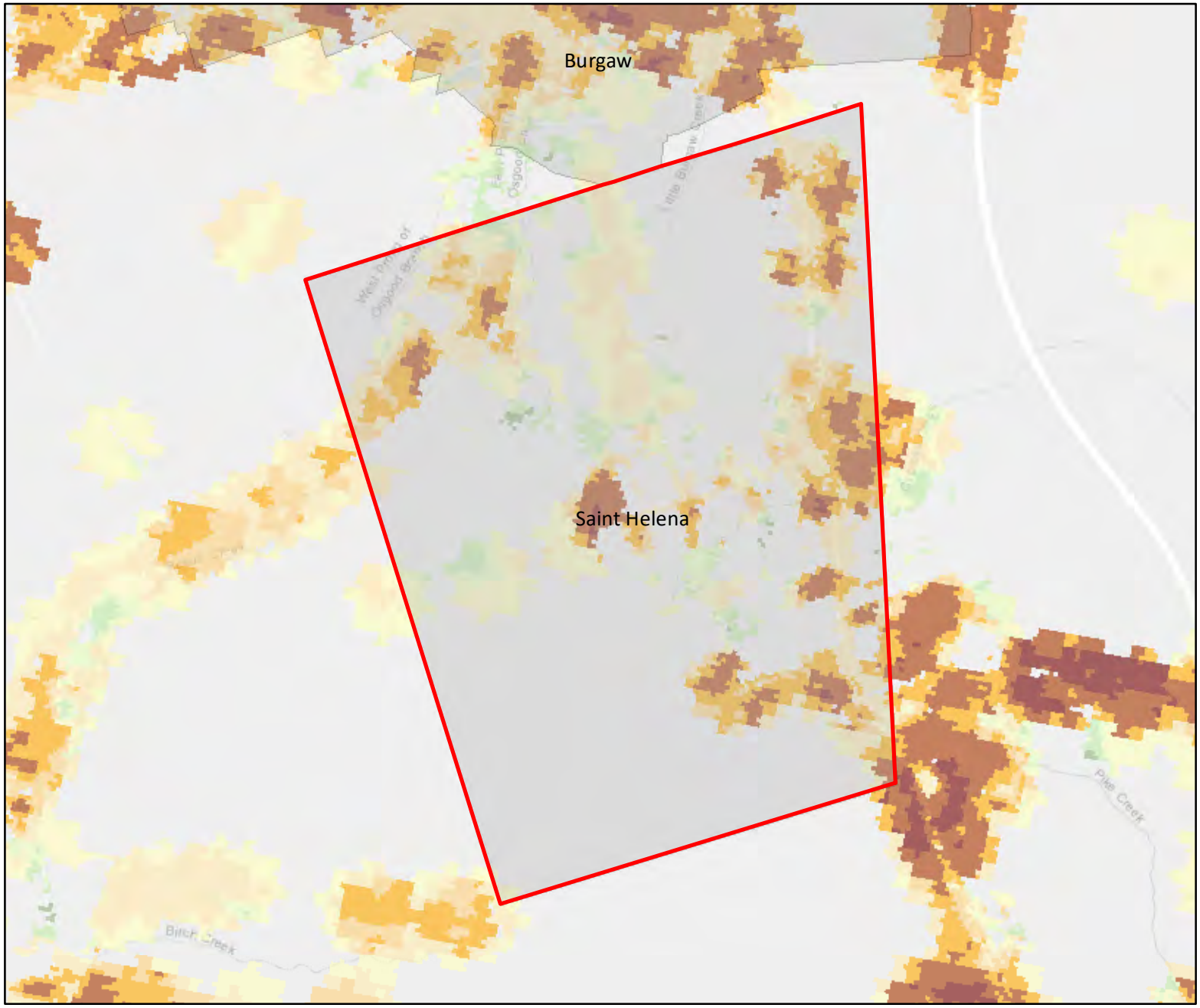
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.325 0.65 1.3 Miles

N

Saint Helena - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

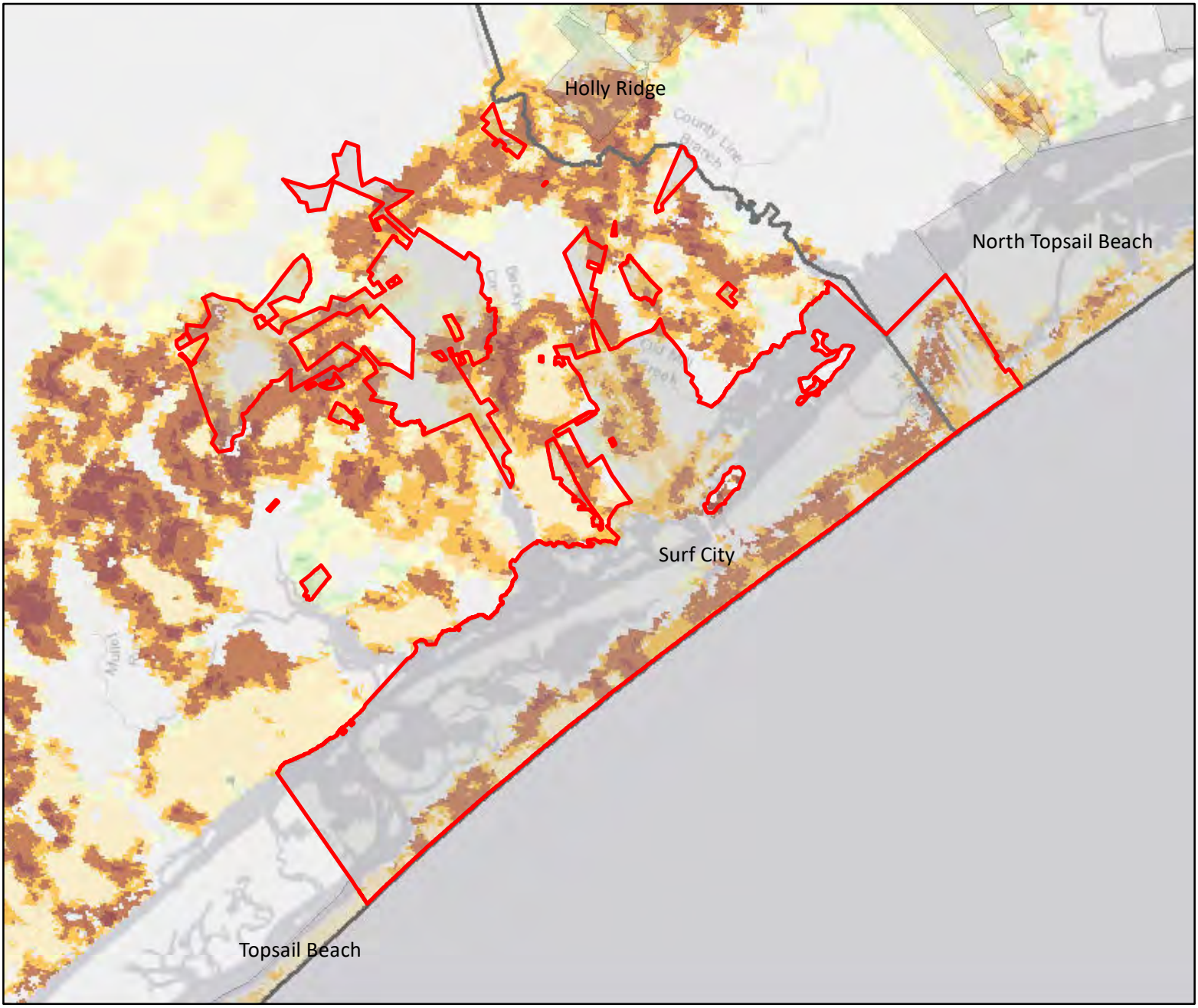
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Surf City - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

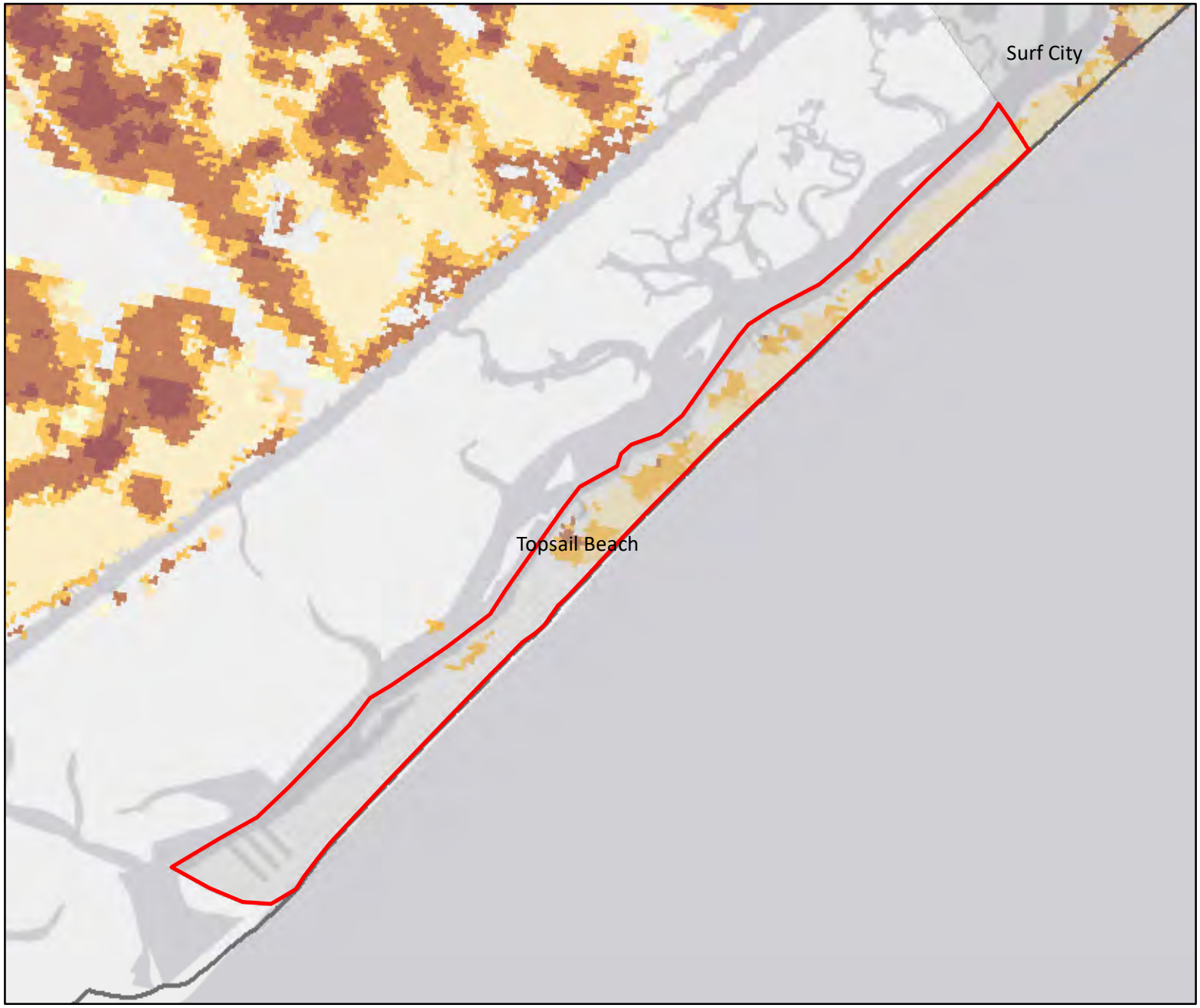
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Topsail Beach - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

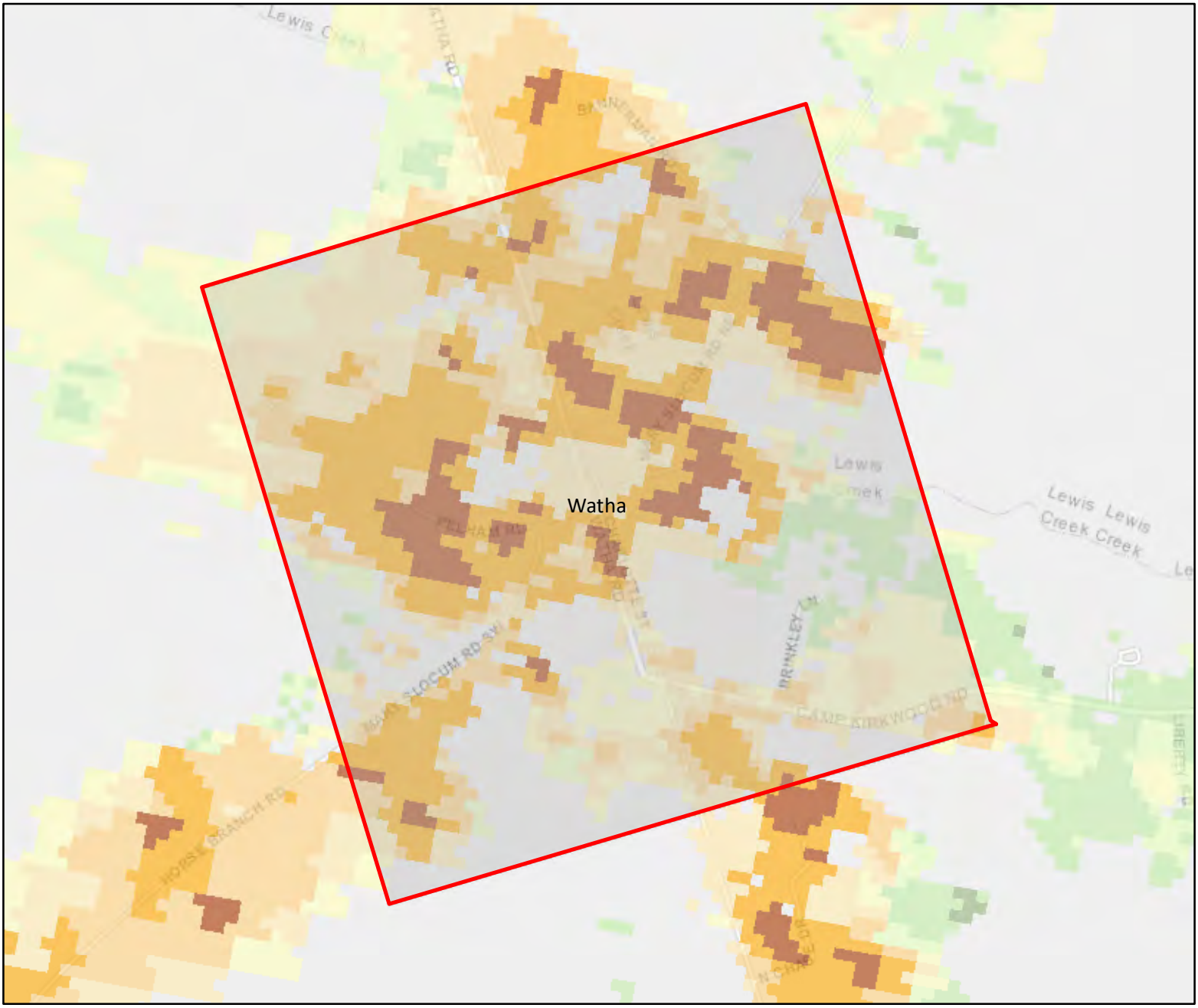
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.35 0.7 1.4 Miles

N

Watha - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Appendix H:
NCEI Storm Event Data

This section of the Plan includes the historic storm event data as reported to the National Centers for Environmental Information.

- H.1 – Drought
- H.2 – Extreme Heat
- H.3 – Flood
- H.4 – Hail
- H.5 – Heavy Rain
- H.6 – Heavy Snow
- H.7 – High Wind
- H.8 – Ice Storm
- H.9 – Lightning
- H.10 – Sleet
- H.11 – Tornado
- H.12 – Thunderstorm
- H.13 – Winter Storm

TABLE H.1: DROUGHT EVENTS (2000-2019)

Date	Description
Brunswick County	
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage.
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage.
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.
New Hanover County	
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage.
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage. The drought was a major contributor to a large fire off of Juniper Road in the Holly Shelter Game Land.
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.
Onslow County	
6/1/2011	Severe drought (D2) designation began for Onslow County in early June 2011. No significant precipitation occurred during the month with only typical summertime afternoon showers and thunderstorms.
7/1/2011	Severe drought (D2) designation in June deteriorated to extreme drought (D3) conditions for Onslow County in early July 2011. No significant precipitation occurred during the month with only typical summertime afternoon showers and thunderstorms.
8/1/2011	Extreme drought (D3) designation continued for Onslow County through late August 2011 just prior to Hurricane Irene. Significant rainfall occurred across the county with the passage of Hurricane Irene. Storm total rainfall from Hurricane Irene at Jacksonville (11.70 inches), Maysville (10.68 inches), and Swansboro (9.76 inches) indicated sufficient precipitation to remove drought designation for Onslow County.
Pender County	
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage.
6/14/2011	Rainfall totals at the end of June were well below average for much of the region, ranging from 55 to 65 percent of normal. Crops were for the most part just beginning to stress, with no reports of widespread drought damage.

Date	Description
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.
7/1/2011	Rainfall amounts continued to be meager, with most areas between eight to twelve inches below normal for the year. There were sporadic reports of localized water rationing, however most communities were still under normal water usage. Although most crops around the region were definitely feeling the stress of the drought, the extent of crop losses around the area is unknown at this time.

TABLE H.2: EXTREME HEAT EVENTS (2000-2019)

Location	Date	Description
Onslow County	7/13/2019	The temperature at KOAJ was 93 with a dew point of 79 which produced a heat index of 110 at the following times on July 13th, 2019:||1030 - 1100 LST, 1100 - 1145 LST, 1155 - 1205 LST, 1215-1246 LST.||The peak heat index occurred at 1200 LST with a temperature of 95 and a dewpoint of 79 producing a heat index of 113 degrees.
Onslow County	7/21/2019	An extended heat wave came to an end when heat index values reached as high as 110 to 115 degrees on July 21.

TABLE H.3: FLOOD EVENTS (2000-2019)

Location	Date	Description
Brunswick County		
SOUTHPORT	7/6/2001	Minor flooding was reported on Caswell Beach Rd. and Long Beach Rd.
GRISSETTOWN	5/29/2010	Emergency Manager reported water flowing across Hwy 17 near Hwy 904 in Ocean Isle Beach. The road was impassable.
TOWN CREEK	6/27/2013	A yard was flooded on Town Creek Road.
CALABASH	7/1/2013	Significant flooding reported. All the ditches were full and were overflowing across several streets.
MILL CREEK	7/13/2013	Portions of Longwood Road were flooded with several stranded vehicles.
MILL CREEK	7/21/2014	Swift flowing water on River Rd at two intersections: Daws Creek Rd and Funston Rd. The flooding trapped about 50 cars.
FULFORD	12/24/2014	Flooding was reported on Holden Beach Road in Shallotte.
EASTBROOK	10/2/2015	Dorsay Lane was flooded.
IREDEL	10/2/2015	Flooding was reported on Marlowtown Road.
REGAN	10/2/2015	Jamestown Road and Ash Little River Road were flooded.
SEASIDE	10/2/2015	Sunset Beach confirms an approximately 20 ft sinkhole near Park Rd, Sunset Blvd, and Hwy 904.
FREELAND	10/3/2015	A sinkhole was forming on Kingtown Road in Ash.
IREDEL	10/3/2015	Flooding was reported on Hwy 17 and Ocean Highway West. Flooding was also reported on SR 1303.
TOWN CREEK	10/6/2015	A report of water covering portions of Hwy 17 near Zion Church Road in the Town Creek area.
ASH	11/3/2015	Flooding was reported on Mill Branch Road and Ash Road.
HOLDEN BEACH	11/3/2015	Flooding was reported on Stanbury Road near Varnamtown.
MILL CREEK	11/3/2015	Flooding was reported on Fifty Lakes Drive and Filmore Road.
MILL CREEK	11/3/2015	Highway 133 near Funston Road was closed due to 8-10 inches of moving water.
LONG BEACH	2/7/2016	Several streets were flooded on Oak Island.
MILL CREEK	2/7/2016	Flooding was reported on Mirror Lake Drive.
OAK GROVE	2/7/2016	Flooding was reported in the Edgar Wood community in Supply.

Location	Date	Description
SOUTHPORT	2/7/2016	Many roads were flooded around Southport.
LELAND	8/8/2017	Nearly four inches of rain fell in Leland, with minor flooding.
MILL CREEK	5/19/2018	E Boiling Spring Road was flooded in several spots. The road was closed near Elm Street.
MILL CREEK	5/19/2018	Fifty Lakes Drive was flooded near Fillmore Road.
MILL CREEK	5/19/2018	Flooding on Highway 87 near Danford Road.
MILL CREEK	5/19/2018	Old Mill Creek Road near Fisher Drive was impassable due to flooding.
MILL CREEK	5/19/2018	There was a foot of water on Funston Road approaching River Road.
REGAN	6/8/2019	Law enforcement reported flooding on Ash Little River Road.
New Hanover County		
WILMINGTON	7/2/2001	A cold front and associated heavy rains caused poor visibilities, minor street flooding and scattered car accidents. One injury was reported.
CASTLE HAYNE	7/11/2001	New Hanover 911 reported water entering a house on Old Mill Rd. Based on radar, around 4 inches of rain fell in Castle Hayne. There were several car accidents with no injuries reported. A newspaper report described about 1200 customers in the Wilmington area without power.
WILMINGTON	9/1/2002	Heavy rain fell on already saturated soil, causing numerous reports of street flooding in Wilmington. 911 reported flooding on New Centre Drive, Wedgefield Drive, River Road, Greenbriar and Billmark roads, and the North College Road exit to I-40.
WILMINGTON	9/15/2002	The remnants of Tropical Storm Hanna spawned thunderstoms that dumped over two inches of rainfall in a short period of time, causing standing water on South Third Street near Greenfield Lake.
WILMINGTON	8/19/2010	There was around a foot of water with stalled cars on Oleander Drive near Dawson Street. Flooding was also reported on South College Road, between the intersections of Wilshire Boulevard and Wrightsville Avenue.
MASONBORO	9/27/2010	Heavy rain caused a slow rise of a creek that overflowed Beasley Road.
WILMINGTON	9/30/2010	Flooding occurred on Front Street and Greenfield Street.
AIRLEE	6/29/2011	Flooding was reported on Military Cutoff and Main Street.
EAST WILMINGTON	6/29/2011	A water rescue was made at the intersection of Treadwell and Pine Grove Drive.
FERNSIDE	6/29/2011	Cars were trapped in flood waters on New Centre Drive and College Road. Roads were impassable.
NEW BERN JCT	6/29/2011	Flooding was reported on the 200 block of Covil Avenue.
SOUTH WILMINGTON	9/26/2011	Street flooding was reported at the intersection of Independence and 17th Street.
WILMINGTON	9/26/2011	Standing water was reported on 16th Street, between Market and Dawson. Road was impassable.
WILMINGTON	6/27/2013	Greenfield Street was closed at 6th and 7th Avenues due to flooding.
MURRAYSVILLE	7/12/2013	Flooding was reported on Murrayville Road and Setter Lane.
MURRAYSVILLE	7/12/2013	Flooding was reported on White Road. Smaller vehicles could not pass.
MYRTLE GROVE	7/12/2013	Flooding was reported at the intersection of Woods Edge Road and Woodridge Road. Road was impassable.
MYRTLE GROVE	7/12/2013	Over six inches of rain fell around the Myrtle Grove area. Coronado and Greenbriar Drives had heavy flooding, with a report of the water waist deep on Greenbriar Drive.
SEAGATE	7/12/2013	Greenville Loop Rd was reported to be flooded. A foot of water was standing near a home in Greenville Village.
SOUTH WILMINGTON	7/12/2013	Flooding was reported on St. Andrews Drive.
BAYMEADE	9/12/2014	Flooding was reported at the intersection of Putnam and Medallion.
MASONBORO	9/12/2014	Flooding was reported on Beasley Road near Beaver Creek.
WILMINGTON	9/12/2014	Flooding was reported on Wooster and Dawson Streets, as well as Dawson and 16th Street.

Location	Date	Description
CASTLE HAYNE	12/24/2014	Flooding was reported on Holly Shelter Road.
WILMINGTON	12/24/2014	Flooding was reported on 13th Street and Rankin. Flooding was also reported on 16th Street at several intersections.
WRIGHTSBORO	12/24/2014	Flooding was reported at the 5600 block of Castle Hayne Road. Several homes were flooded on Jamaica Drive.
WILMINGTON	6/9/2015	Flooding was reported on Carolina Beach Road in front of Legion Stadium and on Southern Blvd, as well as Morningside Drive.
NEW BERN JCT	7/23/2015	Flooding was reported on Market Street near the YMCA.
SEA BREEZE	7/23/2015	Heavy rain combined with a high tide required a water rescue on Canal Street at Carolina Beach.
WILMINGTON	7/23/2015	Flooding was reported at Oleander and Dawson Street.
WILMINGTON	7/23/2015	Flooding was reported at the intersection of 16th Street and Castle Street.
WILMINGTON	7/23/2015	Flooding was reported on Queen Street and Wooster Ave.
EAST WILMINGTON	7/31/2015	Flooding was reported at the intersection of Oleander and College.
EAST WILMINGTON	7/31/2015	Flooding was reported on Independence Blvd between Shipyard Blvd and Oleander Drive.
BAYMEADE	8/3/2015	Two feet of standing water and stalled cars on Wood Sorrell Rd.
FERNSIDE	8/3/2015	Flooding was reported on Racine Drive near New Centre and Eastwood Rd.
EAST WILMINGTON	8/25/2015	Flooding was reported at the 400 block of Robert E Lee Drive.
WILMINGTON	10/2/2015	There was one to two feet of water on Tandem Court.
BAYMEADE	10/2/2015	Flooding was reported at the 6700 Block of Amsterdam Way.
BAYMEADE	10/2/2015	Flooding was reported at the intersection of Putnam Drive and Medallion Place.
FT FISHER	10/2/2015	Flooding was reported on the road to Fort Fisher.
MURRAYSVILLE	10/2/2015	The 6200 block of Murrayville was impassable due to flooding.
WRIGHTSBORO	10/2/2015	Flooding was reported at 500 Old Mill Road.
BAYMEADE	10/4/2015	Water was overflowing several portions of Torchwood Road.
MASONBORO	10/4/2015	Masonboro Loop Road is flooded between Holiday Hills Drive and Trails End Drive.
MASONBORO	10/4/2015	Roads impassable between Kelly Road near Beasley Road and Sand Hills Drive. Four cars were disabled.
MASONBORO	10/4/2015	Water was entering a home on Oak Bluff Lane.
WRIGHTSBORO	10/4/2015	Flooding was reported on Castle Hayne Road.
FERNSIDE	10/10/2015	Flooding was reported at South Kerr and Emerson.
FT FISHER AFS	2/7/2016	Over half a foot of water was reported to be coming into the yards on General Whiting Blvd. Some water was also getting into basements.
MASONBORO	2/7/2016	Red Berry Drive was completely flooded.
SEA BREEZE	2/7/2016	Flooding was reported along Myrtle Grove Road.
MASONBORO	4/1/2017	Several intersections in the Eagle Nest neighborhood had minor street flooding.
CAROLINA BEACH	8/8/2017	About three and a half inches fell at Carolina Beach.
MYRTLE GROVE	8/8/2017	Over four inches of rain was recorded at the Myrtle Grove Junction.
BAYMEADE	5/19/2018	There was a foot and a half of water along Putnam Road and other roads near Ogden Park. Roads impassable.
EAST WILMINGTON	5/19/2018	There was about a foot of water along College Rd at the intersection of Oleander Drive.
NEW BERN JCT	5/19/2018	Darlington Avenue was closed due to flooding between Broad Street and Frog Pond Place due to a retention pond overflowing.

Location	Date	Description
BAYMEADE	8/15/2018	A slow moving storm produced four inches of rain in Ogden. Police closed Bright Leaf Road at Wendover Lane. Flooding was also reported in the 7400 block of Market Street and on Amsterdam Way.
Onslow County		
Unincorporated Area	10/7/2005	A combination of weather systems including the remnants of Tropical Storm Tammy and low pressure associated with an approaching cold front linked up to cause flooding rains across the area. During a three day period from October 6th through the 8th portions of eastern North Carolina received up to a foot of rainfall. Six to eight inch rainfall totals were common across much of the area. This resulted in flash flooding and widespread flooding across Beaufort, Carteret, Craven, Duplin, Lenoir, Martin, Onslow, Pamlico, and Pitt counties. Many roads across the area were closed due to flooding, and property damage was reported in several counties.
COUNTYWIDE	6/28/2006	Flooding reported across a large area of the county. Water levels reported up to the hood of cars in Jacksonville with 4 feet of water reported on Western Blvd. Flood waters were waist deep in the Tarawa Terrace housing area at Camp Lejeune. Also, 2 to 3 feet of water was reported along Highway 258 and Rhodestown Rd. just south of Richlands.
BELL FORK	4/15/2007	Flooding reported on Bell Fork Road.
BELL FORK	8/6/2009	High water reported on Brynn Marr Road in Jacksonville with several cars stalled.
BELL FORK	8/12/2009	Very heavy rain produced flooding at the intersection of Western Boulevard and Brynn Marr Road. Several cars stalled in the flood waters.
FOLKSTONE	9/7/2009	Flooding reported along Old Folkstone Road.
SWANSBORO	11/12/2009	Heavy rain, with widespread amounts over six inches, flooded numerous secondary roads off Highway 24. Several roads were impassable.
BELL FORK	6/25/2010	Flooding over Western Boulevard with the road briefly impassable.
JCKSNVLL ELLIS ARPT	9/29/2010	Several days of heavy rain led to widespread flooding across Onslow County with many small streams flooded. several roads were flooded and impassable at times.
FULCHERS LNDG	6/29/2011	Onslow County 911 reported water covering roadway on Fulcher Landing Road in Sneads Ferry.
HALF MOON	8/6/2011	Trained spotter reported over one foot of water across multiple roadways near the intersection of Gum Branch Road and Ramsey Drive north of Jacksonville.
GREGORY FORKS	9/12/2014	Very heavy rain produced flooding near Richlands. Roads were reported to be washed out near the intersection of Gregory Fork Road and Turtle Shell Road.
BELL FORK	9/13/2014	Heavy rain in the Jacksonville area produced flooding, with the Public Safety Building and Fire Station One area flooded.
HALF MOON	5/31/2018	Road flooding was reported with water 4 to 5 inches deep. An estimated 3 to 4 inches of rain fell.
Pender County		
HAMPSTEAD	9/7/2009	Rain, ranging from six to ten inches, fell over portions of eastern Pender County. Several major roads were closed, including Hwy 210 and SR-1561. Hughes Road was washed out. Other secondary roads with standing water included Azalea Dr., Sloop Pt Rd., and many roads in Surf City. Many yards had standing water on them.
WALKERS STORE	5/30/2012	Lake Drive was flooded with a foot of standing water.
BURGAW	7/11/2012	Flooding on New Savannah Rd near Penderlea Hwy. The road was blocked and impassable.
PENDERLEA	7/11/2012	Flooding on Shiloh Road. The road was impassable.
VAN EDEN	7/11/2012	Flooding on Horse Branch Road near the 3000 block of Penderlea Hwy.
HAMPSTEAD	8/9/2014	Highway 17 was closed at Hwy 210 due to flooding.
TOPSAIL	8/9/2014	A foot of standing water was reported on the streets of the Castle Bay Golf Course.
TOPSAIL	8/9/2014	A half a foot of water was reported on Hwy 17, causing traffic delays.
TOPSAIL	8/9/2014	Country Club Road was closed due to flooding. A portion of the road was washed away.

Location	Date	Description
TOPSAIL	8/9/2014	Flood waters came into the halls and gymnasium of Topsail Middle School. The gymnasium floor had to be redone.
TOPSAIL	8/9/2014	Widespread flooding was reported on the Belvedere Plantation Golf Course. Up to three feet of standing water near the homes.
WOODSIDE	8/9/2014	Over a half foot of water was reported on Hwy 17 near the Sloop Point Fire Department.
PENDERLEA	6/26/2015	Flooding was reported at the intersection of Penderlea and Shiloh Rd.
HAMPSTEAD	10/2/2015	Flooding was reported at the 1500 block of Hwy 210.
MALPASS CORNER	10/2/2015	Flooding was reported on Herrings Chapel Road.
SHELTER NECK	10/2/2015	Flooding was reported on Hwy 50 near the Pender/Duplin county line.
STAG PARK	10/2/2015	Flooding was reported in Stag Park.
HIGHSMITH	2/4/2016	Flooding was reported on Scott Rd. Road was temporarily closed.
HIGHSMITH	2/7/2016	Significant flooding was reported on Fennel Town Road.
SHELTER NECK	7/3/2017	Flooding on Hwy 50 near Hwy 53.
MARLBORO	7/18/2017	Over three and a half inches of rain was recorded in Castle Hayne.
BURGAW	6/7/2018	Over three inches of rain fell in 30 minutes in Burgaw. Multiple streets were reported to be flooded.

TABLE H.4: HAIL EVENTS (2000-2019)

Location	Date	Size	Description
Brunswick County			
SUPPLY	4/18/2000	0.75	Hail reported ranging from 1/2 to 3/4 inch.
ASH	4/28/2000	0.88	
LELAND	4/28/2000	1	
WINNABOW	4/28/2000	0.75	
GRISSETTOWN	4/29/2000	0.75	Longwood Fire Department reported dime size hail or larger at the fire station.
HOLDEN BEACH	5/25/2000	0.88	Spotter reported nickel-size hail.
CASWELL BEACH	5/28/2000	0.75	Oak Island Dispatch reported dime-size hail at Caswell Beach.
LELAND	5/28/2000	0.75	Dime-size hail reported on the Cape Fear Memorial Bridge.
ASH	7/16/2000	1.75	911 center reported golfball size hail.
BOLIVIA	4/1/2001	0.75	Dime size hail reported at Boiling Springs Lakes.
HOLDEN BEACH	4/1/2001	0.75	Ham radio operator reported dime size hail.
ASH	5/26/2001	1.75	Spotters reported golfball size hail with 50 to 60 mph wind gusts.
LELAND	5/28/2001	1.75	Golfball size hail reported.
SHALLOTTE	5/28/2001	0.75	Skywarn reported dime size hail.
HOLDEN BEACH	3/11/2003	0.75	Holden Beach Pier reported dime size hail.
LELAND	3/11/2003	0.75	911 reported dime size hail.
LELAND	3/11/2003	0.75	Television station reported dime size hail.
LONG BEACH	3/11/2003	1	Long Beach Pier reported quarter size hail.
SOUTHPORT	3/11/2003	1	Spotter reported quarter size hail.
MACO	5/3/2003	1	Skywarn reported quarter size hail.
LELAND	5/31/2003	1.25	Widespread hail was reported by 911, ranging from penny to half dollar size.
MACO	7/12/2003	0.75	Penny size hail was reported.
LELAND	8/23/2003	0.88	Nickel size hail was reported near the Magnolia Greens golf course.
LELAND	6/3/2004	1.25	Half dollar size hail was reported.
LELAND	6/3/2004	0.88	Nickel size hail was reported at Magnolia Greens.
LELAND	6/3/2004	0.88	Nickel size hail was reported.

Location	Date	Size	Description
WINNABOW	6/3/2004	0.75	A spotter reported penny size hail at the intersection of Hwy 87 and US Rt 17.
SHALLOTTE	4/3/2006	0.75	
SHALLOTTE	4/3/2006	0.88	
SOUTHPORT	4/3/2006	1	Quarter size hail was covering the road near Town Creek Bridge.
SOUTHPORT	4/3/2006	1.5	Quarter to ping pong size hail was reported.
ASH	4/8/2006	0.88	
ASH	6/6/2006	0.75	
BOLIVIA	6/6/2006	1	Nickel to quarter size hail was reported.
LELAND	6/6/2006	0.75	Penny size hail was reported on Mellanie Lane.
CALABASH	6/8/2006	1.75	Golfball size hail fell at the intersection of Hwy 17 and Seaside Road.
SHALLOTTE	6/8/2006	0.88	Nickel size hail was reported at Shallotte Point.
LELAND	8/8/2006	0.75	Penny size hail was reported.
SUPPLY	6/5/2007	1	Quarter size hail was reported on Hwy 17 at mile marker 29.
ASH	6/13/2007	0.75	Penny size hail fell.
LELAND	6/25/2007	0.75	Penny size hail fell on Old Mill Road.
MACO	7/27/2007	0.88	Nickel size hail fell on Highway 74/76.
LELAND	3/15/2008	0.75	Report of three-quarter inch hail relayed via Amateur Radio Operator.
NORTH WEST	4/21/2008	0.75	The fire department reported hail up to the size of pennies.
SOUTHPORT	6/17/2008	0.75	Hail ranged in size from pea to penny at Quiznos on Southport Supply Road SE.
SOUTHPORT	6/17/2008	0.88	Nickel size hail was reported near The Clubs at St James Plantation.
BOLIVIA	6/21/2008	0.88	Hail was estimated to the size of nickels.
LONG BEACH ARPT	6/21/2008	0.88	Several reports of hail up to nickel size.
SOUTHPORT	6/21/2008	0.88	Several reports of nickel size hail.
SOUTHPORT	6/21/2008	0.88	Several reports of nickel size hail.
VARNUM	6/21/2008	1	Numerous reports of hail, up to the size of quarters, from west of Long Beach to around Southport.
LANVALE	5/11/2009	1	Hail up to the size of quarters was reported. The hail lasted for about 20 seconds.
WINNABOW	5/11/2009	1	Nickel to quarter size hail was reported on the Town Creek Bridge.
BELL SWAMP	5/10/2011	1	Hail to the size of quarters was reported.
GRISSETTOWN	5/10/2011	1	Hail to the size of quarters was reported near the intersection of Seaside Road and Old Georgetown Road.
MILL CREEK	5/10/2011	1.75	Hail to the size of golf balls was reported along South Shore Drive.
MILL CREEK	5/10/2011	1.75	Hail to the size of golf balls was reported. The report was relayed via the media.
MILL CREEK	5/10/2011	1.25	Hail to the size of half dollars was reported along Caison Loop Road.
MILL CREEK	5/10/2011	1.5	Hail to the size of ping pong balls was reported.
LONG BEACH ARPT	6/5/2011	1	Hail to the size of quarters was reported at the Players Club Golf Course.
MILL CREEK	6/5/2011	1	Hail to the size of quarters was reported.
SECESSION	11/4/2011	1	Hail up to the size of quarters was reported along Coastal Shores Road near the intersection with Seashore Road.
TOWN CREEK	11/4/2011	1	Hail to the size of quarters was reported near the intersection of Town Creek Road and Old Town Creek Road.
LONG BEACH	3/19/2012	1	Hail to the size of quarters was reported at NE 15th Street and East Yacht Drive. The hail lasted for 3 minutes.
SECESSION	3/25/2012	1.5	Hail to the size of ping pong balls was reported.
SUPPLY	3/25/2012	1.75	Hail to the size of golf balls was reported.
BOLIVIA	4/26/2012	0.88	Hail to the size of nickels was reported. The time was estimated by radar data.

Location	Date	Size	Description
BOWEN PT	5/14/2012	0.75	Hail to the size of pennies was reported on Bay Road SW.
CALABASH	7/1/2012	1	Hail up to the size of quarters was reported.
PHOENIX	10/7/2012	1	Hail to the size of quarters was reported along Merrywood Drive.
LONGWOOD	6/13/2013	1	Hail to the size of quarters was reported at the intersection of Longwood Road and Etheridge Road.
EAST ARCADIA	5/23/2014	0.88	Hail to the size of nickels was reported west of Highway 17 in Calabash. The location was estimated based on radar data.
GRISSETTOWN	5/23/2014	1	Quarter size hail reportedly lasted for 5 minutes.
THOMASBORO	5/23/2014	1.75	Golf ball size hail was reported in the community of Brunswick Plantation.
WINNABOW	7/28/2014	1	Marble to quarter size hail was reported. The report was relayed through the media.
SECESSION	8/21/2014	0.75	Hail slightly larger than a dime was reported.
SECESSION	8/21/2014	0.88	Hail up to the size of nickels was reported.
LONGWOOD	7/13/2015	1.25	Hail to the size of half dollars was reported.
REGAN	7/13/2015	1	Hail up to the size of quarters was reported on Pireway Road.
EASY HILL	5/3/2016	1	Nickel to quarter size hail was reported near Mallory Creek.
BOWEN PT	4/5/2017	1	Hail to the size of quarters was reported.
CAUSE LNDG	4/5/2017	1	Hail to the size of dimes increased to the size of quarters.
HOLDEN BEACH	4/5/2017	1.5	Hail to the size of ping pong balls was reported 2 miles west of the Intracoastal Waterway Bridge.
LONG BEACH ARPT	4/5/2017	1.75	Hail to the size of golf balls was reported. The time was estimated based on radar data.
MIDWAY	4/5/2017	2	Hail was estimated up to 2 inches in size near Sunset Harbor Rd. The time was estimated based on radar data. The report was relayed by the media.
SECESSION	4/5/2017	1.25	Hail to the size of quarters and half dollars was reported.
TOWN CREEK	5/30/2017	0.75	Hail was measured to the size of three-quarters of an inch.
ELIAH	6/15/2018	1	Quarter size hail was reported at the Magnolia Greens golf course.
LELAND	6/2/2019	1	Quarter size hail was reported on Hwy 74.
PHOENIX	6/2/2019	1	Quarter size hail damaged a car on Hooper Rd in Leland.
PHOENIX	6/2/2019	1	Quarter size hail was reported on Mt Misery Rd.
LANVALE	7/3/2019	1	Quarter size hail was reported in Leland.
			New Hanover County
WILMINGTON	4/18/2000	0.75	NWS employee reported dime size hail at their house in Ogden.
MYRTLE GROVE	4/28/2000	0.88	
WILMINGTON	5/22/2000	0.75	NWS employee reported dime-size hail in Ogden, at the intersection of Gordon and Market St.
MYRTLE GROVE	7/16/2000	1	Quarter size hail reported.
WILMINGTON	4/1/2001	0.88	Ham radio reported both dime and nickle size hail.
WILMINGTON	5/28/2001	1	One inch hail occurred at the Wilmington airport. The hail was observed and entered in the Wilmington ASOS observation.
WILMINGTON	4/3/2002	0.75	Dime size hail reported on Shipyard Blvd.
MYRTLE GROVE	5/10/2002	1	New Hanover 911 reported quarter size hail. Dime size hail was also reported on Carolina Beach Rd.
WILMINGTON	7/31/2002	0.75	Dime size hail reported near Oleander and Hydrangea Drives.
CAROLINA BEACH	3/11/2003	1	911 reported quarter size hail.
WILMINGTON	3/11/2003	0.75	Ham radio operator reported dime size hail at the state port.
WILMINGTON	3/11/2003	0.88	Off duty NWS employee reported nickel size hail.
WILMINGTON	3/11/2003	0.88	Off duty NWS employee reported nickel size hail.

Location	Date	Size	Description
WILMINGTON	3/11/2003	1.25	Off duty NWS employee reported one-inch size hail. The public also reported hail at Wrightsville Beach.
WILMINGTON	3/11/2003	0.75	Public reported dime size hail.
WILMINGTON	3/11/2003	1.25	Spotter reported half dollar size hail. The police also reported dime size hail at Wrightsville Beach.
MURRAYSVILLE	5/29/2003	0.75	An off-duty NWS employee reported penny size hail at his home.
WILMINGTON	5/31/2003	1	Widespread hail was reported in and around the city of Wilmington, ranging from penny to quarter size.
WILMINGTON	8/23/2003	1	New Hanover 911 reported quarter size hail in Wrightsboro.
WRIGHTSBORO	6/3/2004	1.25	Quarter to half dollar size hail was reported at the Fire/Rescue station 51.
MYRTLE GROVE	7/17/2004	1	A ham radio operator reported quarter size hail.
WILMINGTON	7/13/2005	0.75	Penny size hail was reported at the intersection of Shipyard Boulevard and Carolina Beach Rd.
WILMINGTON	1/2/2006	0.75	Hail covered the ground on Greenville Loop Rd.
CAROLINA BEACH	4/3/2006	1.75	Golf ball size hail was reported.
CAROLINA BEACH	4/3/2006	0.88	Nickel size hail was covering the ground just north of Snows Cut Bridge.
WILMINGTON	4/3/2006	0.75	Penny size hail reported at Pine Grove and Holly Tree Rd.
WILMINGTON	6/6/2006	0.88	Nickel size hail was reported in the Kings Grant subdivision.
WILMINGTON	6/6/2006	0.75	Penny size hail.
WILMINGTON	6/6/2006	0.75	
WILMINGTON	6/8/2006	1.75	Penny to golf ball size hail was reported in the Ogden area.
WILMINGTON	8/8/2006	0.75	Penny size hail was reported.
WILMINGTON	6/25/2007	0.75	Penny size hail fell along U.S. Highway 421.
WILMINGTON	3/15/2008	1	Quarter size hail was reported on Front Street.
FERNSIDE	4/21/2008	0.75	The public reported pea to penny size hail. The report was relayed via WECT television station.
MASONBORO	4/21/2008	0.75	National Weather Service employee measured three-quarter inch hail.
SEAGATE	4/21/2008	0.75	National Weather Service employee reported penny size hail.
EAST WILMINGTON	6/22/2008	0.88	Hail up to the size of nickels partially covered the ground.
WILMINGTON	6/22/2008	0.88	Hail up to the size of nickels was reported.
SEA BREEZE	5/11/2009	1.75	Hail up to the size of golf balls was reported along Red Lighthouse Lane.
SEA BREEZE	5/11/2009	0.88	Hail up to the size of nickels was reported on Player Way. The hail covered the ground.
MASONBORO	5/19/2010	0.75	Penny size hail was reported.
CAROLINA BEACH	5/10/2011	1.75	Hail to the size of golf balls was reported.
CAROLINA BEACH	5/10/2011	1.75	Hail to the size of golf balls was reported.
KURE BEACH	5/10/2011	1.75	Hail to the size of golf balls was reported.
MURRAYSVILLE	6/23/2011	1	Hail to the size of quarters was relayed by another National Weather Service office.
BAYMEADE	6/26/2011	0.75	Hail to the size of pennies was reported.
HARBOR IS	6/29/2011	1.75	Hail to the size of golf balls was reported at Wings.
CASTLE HAYNE	10/7/2012	0.88	Hail to the size of nickels reportedly covered the ground.
FERNSIDE	7/28/2014	1	Hail to the size of quarters was reported at the Golden Corral Restaurant on New Centre Drive.

Location	Date	Size	Description
FERNSIDE	7/28/2014	1	Quarter size hail was reported at the intersection of Martin Luther King Jr. Parkway and N Kerr Avenue.
MYRTLE GROVE	5/3/2016	0.75	Hail to the size of pennies was reported.
MURRAYSVILLE	5/12/2016	1	Hail to the size of quarters was reported in Brittany Lakes subdivision.
BAYMEADE	7/19/2016	0.75	Dime to penny size hail was reported near the intersection of Military Cutoff Road and Market Street.
BAYMEADE	7/19/2016	1	Hail to the size of quarters was reported near the intersection of Gordon Road and Market Street. The time was estimated by radar data.
BAYMEADE	7/12/2018	1	Quarter size hail was reported on Gordon Road, near Interstate 40.
MURRAYSVILLE	9/9/2019	0.75	The public reported three quarter inch hail fell for several minutes.
NEW BERN JCT	9/9/2019	1	Quarter size hail was reported.
			Onslow County
SNEADS FERRY	4/18/2000	0.75	
RICHLANDS	5/28/2000	0.75	
SWANSBORO	8/13/2000	0.75	
VERONA	8/13/2000	0.75	
Unincorporated Area	4/1/2001	0.75	
CATHERINE LAKE	4/1/2001	0.75	
HAW BRANCH	4/1/2001	0.75	
JACKSONVILLE	4/1/2001	1.75	
HAW BRANCH	5/12/2001	1.25	
RICHLANDS	5/20/2001	0.75	
HAW	5/26/2001	0.75	
JACKSONVILLE	5/28/2001	0.75	
CAMP LEJEUNE	7/6/2001	0.75	
RICHLANDS	6/14/2002	0.88	
HAW BRANCH	7/10/2002	0.75	
HAW BRANCH	8/19/2002	1.25	
RICHLANDS	3/6/2003	0.88	Onslow county 911 reported nickel size hail near Haws Run.
CATHERINE LAKE	4/30/2003	1	Public reported one inch diameter hail.
BELGRADE	7/17/2003	1	Onslow county 911 center reported hail.
RICHLANDS	6/11/2004	0.75	Public reported penny size hail.
PINEY GREEN	7/11/2004	1.75	Public report of golf ball size hail.
JACKSONVILLE	10/13/2004	0.75	
NORTH TOPSAIL BEACH	5/24/2005	0.88	
CAMP LEJEUNE	8/3/2005	0.75	Penny size hail reported near Highway 24.
CAMP LEJEUNE	8/16/2005	0.75	Penny size hail reported south of Jacksonville from near Camp Lejeune to near Verona.
JACKSONVILLE	4/3/2006	1.25	Public reported penny to quarter size hail in Jacksonville.
Unincorporated Area	4/17/2006	0.75	
SWANSBORO	4/17/2006	1	
JACKSONVILLE	5/26/2006	0.75	
JACKSONVILLE	5/26/2006	1.5	
CATHERINE LAKE	6/3/2006	1	
CAMP LEJEUNE	6/5/2006	0.75	

Location	Date	Size	Description
SWANSBORO	6/5/2006	0.88	
CAMP LEJEUNE	6/6/2006	1.75	
HUBERT	6/6/2006	0.75	
JACKSONVILLE	6/6/2006	0.75	
PINEY GREEN	6/6/2006	0.75	
SWANSBORO	6/6/2006	1	
RICHLANDS	6/12/2006	0.88	
JACKSONVILLE	6/28/2006	1	
RICHLANDS	6/28/2006	1	
JACKSONVILLE	6/30/2006	0.75	Hail reported in Haws Run.
JACKSONVILLE	7/29/2006	0.75	Hail reported at the intersection of Highway 17 and the Highway 17 Bypass.
HUBERT	8/5/2006	0.75	
Unincorporated Area	6/5/2007	0.88	The public reported nickel size hail.
BELL FORK	6/5/2007	0.75	Penny size hail and large tree branches were reported down on Gum Branch Road.
BELL FORK	6/5/2007	1	Quarter size hail was reported near Highway 17.
CATHERINE LAKE	6/5/2007	0.88	Nickel size hail was reported near Catherine Lake.
ERVINTOWN	6/5/2007	0.75	Penny size hail was reported in Ervintown.
HAW	6/5/2007	0.75	County 911 center reported penny sized hail near highway 53.
SKY MANOR ARPT	6/5/2007	1.75	Golf ball size hail was reported on Highway 53 near Angola.
MORTON FORK	6/12/2007	0.75	Penny size hail was reported just west of Morton Park.
BELGRADE	6/16/2007	0.75	Penny size hail was reported in Belgrade.
SEAHAVEN	3/15/2008	1	Spotter reported quarter size hail near North Topsail Beach.
ERVINTOWN	4/21/2008	0.75	Penny size hail covering the ground in Richlands.
SKY MANOR, SWANSBORO	4/21/2008	0.75	An upper level area of low pressure moved across eastern North Carolina during the afternoon of April 21 2008. Cold temperatures in the mid-levels of the atmosphere were conducive for thunderstorms with many producing hail.
BELL FORK	5/5/2008	0.88	Scattered thunderstorms developed just north of a stationary front across eastern North Carolina during the afternoon of May 5th. Isolated storms became severe producing large hail.
CATHERINE LAKE	5/5/2008	0.75	Scattered thunderstorms developed just north of a stationary front across eastern North Carolina during the afternoon of May 5th. Isolated storms became severe producing large hail.
KELLUMTOWN	5/5/2008	0.75	Scattered thunderstorms developed just north of a stationary front across eastern North Carolina during the afternoon of May 5th. Isolated storms became severe producing large hail.
MIDWAY PARK	5/5/2008	0.88	Scattered thunderstorms developed just north of a stationary front across eastern North Carolina during the afternoon of May 5th. Isolated storms became severe producing large hail.
BELL FORK	5/10/2008	1	A weak cold front stalled over southeast North Carolina during the early morning hours of May 10th. Isolated thunderstorms developed along this boundary and moved across the southern parts of eastern North Carolina. Some of the storms became severe producing large hail and strong winds.
ERVINTOWN	5/10/2008	0.75	A weak cold front stalled over southeast North Carolina during the early morning hours of May 10th. Isolated thunderstorms developed along this boundary and moved across the southern parts of eastern North Carolina. Some of the storms became severe producing large hail and strong winds.

Location	Date	Size	Description
HALF MOON	5/10/2008	0.75	A weak cold front stalled over southeast North Carolina during the early morning hours of May 10th. Isolated thunderstorms developed along this boundary and moved across the southern parts of eastern North Carolina. Some of the storms became severe producing large hail and strong winds.
HUBERT	5/10/2008	0.75	A weak cold front stalled over southeast North Carolina during the early morning hours of May 10th. Isolated thunderstorms developed along this boundary and moved across the southern parts of eastern North Carolina. Some of the storms became severe producing large hail and strong winds.
BELL FORK	5/11/2008	0.88	Numerous thunderstorms developed near the coast of eastern North Carolina during the late afternoon and evening hours ahead of a cold front. Unstable air ahead of the cold front combined with strong wind shear to produce rotating thunderstorms and several tornadoes were reported near the south coast in parts of Onslow...Jones and Carteret counties.
BELL FORK	5/11/2008	0.88	Numerous thunderstorms developed near the coast of eastern North Carolina during the late afternoon and evening hours ahead of a cold front. Unstable air ahead of the cold front combined with strong wind shear to produce rotating thunderstorms and several tornadoes were reported near the south coast in parts of Onslow...Jones and Carteret counties.
HAW	5/11/2008	0.75	Numerous thunderstorms developed near the coast of eastern North Carolina during the late afternoon and evening hours ahead of a cold front. Unstable air ahead of the cold front combined with strong wind shear to produce rotating thunderstorms and several tornadoes were reported near the south coast in parts of Onslow...Jones and Carteret counties.
MIDWAY PARK	5/11/2008	0.75	Numerous thunderstorms developed near the coast of eastern North Carolina during the late afternoon and evening hours ahead of a cold front. Unstable air ahead of the cold front combined with strong wind shear to produce rotating thunderstorms and several tornadoes were reported near the south coast in parts of Onslow...Jones and Carteret counties.
PALO ALTO	5/11/2008	0.75	Numerous thunderstorms developed near the coast of eastern North Carolina during the late afternoon and evening hours ahead of a cold front. Unstable air ahead of the cold front combined with strong wind shear to produce rotating thunderstorms and several tornadoes were reported near the south coast in parts of Onslow...Jones and Carteret counties.
BELL FORK	5/20/2008	0.75	A cold front crossed eastern North Carolina during the late evening hours of May 20th. Thunderstorms became numerous across the area during the late afternoon and early evening hours ahead of the cold front. Some of the thunderstorms became severe producing numerous reports of large hail.
CATHERINE LAKE	5/20/2008	0.75	A cold front crossed eastern North Carolina during the late evening hours of May 20th. Thunderstorms became numerous across the area during the late afternoon and early evening hours ahead of the cold front. Some of the thunderstorms became severe producing numerous reports of large hail.
VERONA	5/20/2008	0.75	A cold front crossed eastern North Carolina during the late evening hours of May 20th. Thunderstorms became numerous across the area during the late afternoon and early evening hours ahead of the cold front. Some of the thunderstorms became severe producing numerous reports of large hail.
BELL FORK	6/1/2008	0.75	An upper level disturbance and cold front approaching from the west, combined with a very unstable atmosphere, led to scattered thunderstorms over eastern North Carolina. Most of the storms occurred during the late afternoon and evening hours with some producing strong winds and large hail.
KELLUMTOWN	6/1/2008	0.88	An upper level disturbance and cold front approaching from the west, combined with a very unstable atmosphere, led to scattered thunderstorms over eastern

Location	Date	Size	Description
			North Carolina. Most of the storms occurred during the late afternoon and evening hours with some producing strong winds and large hail.
MIDWAY PARK	6/1/2008	1	An upper level disturbance and cold front approaching from the west, combined with a very unstable atmosphere, led to scattered thunderstorms over eastern North Carolina. Most of the storms occurred during the late afternoon and evening hours with some producing strong winds and large hail.
BELL FORK	6/29/2008	1.5	Hot temperatures and high humidity led to a very unstable air-mass across eastern North Carolina during the afternoon and evening of June 29th. Scattered thunderstorms developed along the sea breeze during the afternoon and a few became severe producing damaging winds and large hail.
BELL FORK	6/29/2008	0.88	Hot temperatures and high humidity led to a very unstable air-mass across eastern North Carolina during the afternoon and evening of June 29th. Scattered thunderstorms developed along the sea breeze during the afternoon and a few became severe producing damaging winds and large hail.
CAMP LEJEUNE	6/29/2008	2	Hot temperatures and high humidity led to a very unstable air-mass across eastern North Carolina during the afternoon and evening of June 29th. Scattered thunderstorms developed along the sea breeze during the afternoon and a few became severe producing damaging winds and large hail.
HALF MOON	6/29/2008	1	Hot temperatures and high humidity led to a very unstable air-mass across eastern North Carolina during the afternoon and evening of June 29th. Scattered thunderstorms developed along the sea breeze during the afternoon and a few became severe producing damaging winds and large hail.
HUBERT	7/21/2008	0.88	Nickel sized hail reported in Bear Creek.
BELL FORK	10/1/2008	0.75	A cold front crossed eastern North Carolina during the evening of October 1st 2008. warm and unstable air ahead of the cold front help produce scattered thunderstorms over the area. A few of the storms became severe and produced large hail.
BELGRADE	6/13/2009	1.75	A few severe thunderstorms developed just ahead of a weak cold front across eastern North Carolina during the evening of June 13th 2009.
DEPPE	6/13/2009	0.75	A few severe thunderstorms developed just ahead of a weak cold front across eastern North Carolina during the evening of June 13th 2009.
CATHERINE LAKE	7/23/2009	0.75	Penny size hail reported near Highway 258 and Rhodes Town Road.
CATHERINE LAKE	7/24/2009	0.75	Onslow County 911 Center relayed report of hail and strong winds along Fire Tower Road and Highway 111 near Catherine Lake.
GUM BRANCH	7/24/2009	0.75	Penny size hail reported along Northwest Bridge Road 4 miles southeast of Richlands.
HALF MOON	7/24/2009	0.88	Hail reported at the intersection of Gum Branch Road and Ramsey Road.
HALF MOON	7/24/2009	0.75	A cold front and upper level disturbance combined to produce widespread severe thunderstorms across the area mainly during the afternoon hours.
MIDWAY PARK	7/24/2009	0.75	Hail reported near Camp Lejeune main gate.
VERONA	7/24/2009	0.88	Hail reported at the intersection of Dawsons Cabin Road and Highway 17.
ERVINTOWN	8/5/2009	0.75	Penny size hail reported in Richlands.
JARMANTOWN	8/5/2009	0.75	Hail reported 6 miles northwest of Richlands.
TAR LNDG	10/13/2010	1	A cold front moved slowly south through eastern North Carolina during the afternoon and evening of October 13th 2010. An isolated thunderstorm developed along the front over Onslow county and produced large hail during the evening.
FOLKSTONE	6/29/2011	0.75	County official reported penny size hail, a wind gust estimated at 50 mph, and minor ponding of water on roadways.
HOLLY RIDGE	6/29/2011	0.88	County official reported nickel size hail with heavy rain in downtown Holly Ridge.

Location	Date	Size	Description
HAWKSIDE	7/24/2011	1	Public reported quarter inch hail near the intersection of Indian Drive and Gum Branch Road.
HAWKSIDE	7/24/2011	0.88	Trained spotter reported nickel size hail in Gum Branch.
CAMP LEJEUNE	8/12/2011	1	Public reported quarter inch hail north of Jacksonville.
ERVINTOWN	9/30/2011	0.75	Law enforcement reported penny size hail in Richlands.
HAW BRANCH	2/24/2012	1	Scattered showers and thunderstorms moved across eastern North Carolina during the afternoon of February 24th ahead of cold front. A few of the storms became severe producing strong winds and large hail.
HAWKSIDE	3/25/2012	1	Broadcast media relayed public report and pictures of quarter size hail near New River.
BROCKS	3/30/2012	0.75	Isolated thunderstorms developed over the southern sections of eastern North Carolina during the late afternoon of March 30th as a warm front slowly lifted north into the area.
HUFFMANTOWN	3/30/2012	1	Isolated thunderstorms developed over the southern sections of eastern North Carolina during the late afternoon of March 30th as a warm front slowly lifted north into the area.
BELL FORK	5/5/2012	0.88	Public reported nickel size hail.
JARMANTOWN	7/1/2012	1.75	Public reported golf ball size hail in Jarmantown.
DIXON	3/22/2014	1	Quarter sized hail was observed at Dixon High School.
HUBERT	3/22/2014	1	Public reported quarter size hail and strong winds along Queens Creek.
SHELL ROCK LNDG	3/22/2014	0.75	Spotter reported penny sized hail near Hammocks Beach.
STARLING	3/22/2014	0.75	An observer reported dime to penny sized hail south-southeast of Hubert.
STARLING	3/22/2014	1.75	Golf ball sized hail reported near Hubert.
SWANSBORO	3/22/2014	1.75	Spotter reported golf ball sized hail in Swansboro.
FOLKSTONE	5/23/2014	0.88	North Shore Golf Course estimated penny to nickel sized hail.
FOLKSTONE	5/23/2014	0.75	Public reported dime size hail.
FOLKSTONE	5/23/2014	0.88	Public reported nickel size hail.
HUBERT	5/23/2014	0.88	Onslow County 911 center received report of nickel sized hail in Hubert.
HAW BRANCH	5/27/2014	1	Onslow County 911 center relayed report of quarter size hail near the Hwy 24 and Hwy 258 intersection.
JCKSNVLL ELLIS ARPT	9/17/2014	1	Spotter reported quarter sized hail just south of the Albert J Ellis Airport.
BELL FORK	6/19/2015	1	Public report through social media of quarter size hail in Jacksonville.
HAWKSIDE	6/19/2015	1	Onslow County 911 center reported nickel to quarter size hail at their location. Public also reported one-inch hail.
JACKSONVILLE	6/19/2015	1	Public reported 1-inch hail in Jacksonville.
TAR LNDG	6/19/2015	0.88	Onslow County 911 Center relayed public report of nickel sized hail on Falcon Crest Road west of Jacksonville.
ERVINTOWN	6/14/2016	1.25	Half dollar size hail reported in Richlands.
ERVINTOWN	6/14/2016	1	Quarter size hail reported in Richlands.
GUM BRANCH	7/19/2016	0.88	Report of nickel size hail in Gum Branch.
HALF MOON	7/19/2016	0.88	Nickle size hail reported in Half Moon.
SWANSBORO	7/19/2016	0.75	Dime size hail reported in Swansboro.
SNEADS FERRY	6/14/2018	1	Quarter size hail fell at Everett Yopp Dr.
CATHERINE LAKE	6/24/2018	1.5	Scattered to numerous thunderstorms developed over Eastern North Carolina during the afternoon and evening hours. Some of these storms became severe with large hail and damaging winds. An upper level trough of low pressure and strong

Location	Date	Size	Description
			shear combined with strong instability over the area to produce the severe thunderstorms.
JACKSONVILLE	6/24/2018	1	Quarter size hail was reported on Henderson Drive.
JACKSONVILLE	6/24/2018	1	Quarter size hail was reported via social media.
JACKSONVILLE	6/24/2018	1	Quarter size hail was reported.
Pender County			
CURRIE	4/18/2000	0.75	Trained spotter reported dime size hail.
SCOTTS HILL	5/22/2000	0.75	Skywarn spotter reported dime-size hail.
HAMPSTEAD	5/25/2000	0.75	
PENDERLEA	7/16/2000	1.75	Golfball to as large as softball size hail fell in Penderlea. Extensive crop damage was noted, and large limbs were reported snapped off the treetops. A storm survey estimated the winds at 60 to 70 mph.
WARDS CORNER	7/16/2000	1.25	
WATHA	7/16/2000	1	
WILLARD	7/16/2000	1	Quarter size hail and numerous trees down were reported. The wind estimate is unknown.
BURGAW	7/22/2000	0.75	Spotter reported dime size hail.
PENDERLEA	7/22/2000	1	Deputy reported quarter size hail.
CURRIE	8/11/2000	0.75	Dime size hail reported.
HAMPSTEAD	4/1/2001	0.75	Spotter reported dime size hail.
ROCKY PT	4/1/2001	0.75	TV station reported dime size hail.
WILLARD	5/12/2001	1.75	Spotter reported golfball size hail.
HAMPSTEAD	5/28/2001	1.75	NWS employee reported golfball size hail.
CURRIE	5/29/2003	0.75	A spotter reported penny size hail.
CURRIE	5/29/2003	1	A spotter reported quarter size hail.
CURRIE	5/29/2003	0.75	Penny size hail covered the ground.
SCOTTS HILL	5/29/2003	0.75	A Skywarn spotter reported penny size hail.
SURF CITY	5/29/2003	1	Surf City police reported quarter size hail.
PENDERLEA	6/20/2003	0.88	The Penderlea general store reported nickel size hail. A tree and large limbs were also reported down.
MAPLE HILL	7/11/2004	0.75	Penny size hail was reported.
WATHA	1/31/2006	1	Rocky Point fire department reported quarter size hail.
ATKINSON	4/3/2006	1.75	Golfball size hail was reported near Hwy 421 and 53.
ATKINSON	5/26/2006	1.75	Golfball size hail fell along Hwy 421.
BURGAW	5/26/2006	0.75	Penny size hail was reported.
WATHA	6/6/2006	0.88	Nickel size hail covered the ground.
WATHA	6/6/2006	0.75	Penny size hail fell.
HAMPSTEAD	6/8/2006	0.75	Penny size hail was reported just north of Scotts Hill.
CURRIE	6/25/2007	0.75	Penny size hail fell on Hwy 421.
SHELTER NECK	4/21/2008	0.75	Hail covered the ground along State Route 53.
BURGAW	5/5/2008	0.75	Law enforcement reported penny size hail.
MARLBORO	5/5/2008	0.75	EMS reported hail along U.S. Highway 117, just north of Castle Hayne.
ROCKY PT	5/5/2008	0.75	Penny size hail fell at the intersection of U.S. Highway 117 and State Route 210.
EAST ARCADIA	5/11/2008	1	A National Weather Service employee measured one-inch hail.
MARLBORO	5/11/2008	1.75	The public measured golf ball size hail in the Swan Plantation community, about one mile north of the Cape Fear River Bridge on U.S. Highway 117.
TOPSAIL	5/11/2008	0.88	A National Weather Service employee reported penny to nickel size hail.
ATKINSON	5/20/2008	0.75	A Pender County Deputy reported penny size hail on State Route 53.

Location	Date	Size	Description
BELLS XRDS	6/9/2008	0.88	Report of nickel size hail along NC Highway 210.
PENDERLEA	4/20/2009	0.88	Hail up to the size of nickels was reported.
PINEY WOOD	4/28/2011	1	In the conduction of a National Weather Service Storm Survey, those interviewed stated they observed hail to the size of quarters along Highway 421.
SURF CITY	6/29/2011	0.75	Hail to the size of pennies was reported.
MURRAY TOWN	9/28/2011	1	Hail to the size of quarters was reported near the intersection of Highway 53 and Burgaw Creek Loop Road.
BURGAW	3/25/2012	1	Nickel to quarter size hail covered the ground.
MALPASS CORNER	3/25/2012	1	Hail up to the size of quarters was reported.
WARDS CORNER	3/25/2012	0.88	Nickel size hail covered the ground.
HAMPSTEAD	5/22/2012	1.75	Hail to the size of golf balls was reported on Sheep Ford Road.
HAMPSTEAD	5/22/2012	1	One-inch hail was measured in the Cross Creek subdivision.
HAMPSTEAD	5/22/2012	1	One-inch hail was measured on Knollwood Drive.
ROCKY PT	5/22/2012	1	Hail to the size of quarters was reported near the intersection of Highway 117 and 210.
ROCKY PT	5/22/2012	0.75	Three-quarter inch hail was measured.
CURRIE	6/23/2012	0.75	Hail to the size of pennies was reported.
WILLARD	7/1/2012	1	Hail to the size of quarters was reported.
ATKINSON	8/2/2012	1	Hail to the size of quarters was reported.
MARLBORO	10/7/2012	1	Hail to the size of quarters was reported along Willows Bay Drive.
MARLBORO	10/7/2012	1	Hail to the size of quarters was reported near the intersection of Carver Drive and Summit Ridge Road.
MARLBORO	3/22/2014	0.88	Hail up to the size of nickels was reported at the intersection of Carver Drive and Summit Ridge Drive.
MARLBORO	3/22/2014	1	Hail up to the size of quarters was reported on the Pender County side of the I-40 bridge. The time was estimated based on radar data.
MARLBORO	3/22/2014	1.5	Irregularly shaped hailstones estimated at quarter to ping pong ball size were reported in Summit Ridge. The time was estimated based on radar data.
LONG CREEK	5/29/2014	1	Hail to the size of quarters was reported.
SHELTER NECK	6/5/2014	1	Quarter size hail reportedly broke a window on a mobile home on John Pickett Road. The time was estimated based on radar data.
WATHA	6/18/2015	0.75	Hail to the size of pennies was reported.
VAN EDEN	5/3/2016	1.5	Hail to the size of ping pongs was reported.
SIX FORKS	5/13/2016	1	A video showed hail falling. The size was estimated to be dime to quarter size. The time was estimated by radar.
SCOTTS HILL	7/14/2016	1	Hail up to the size of quarters was reported. The hail lasted for several minutes.
BURGAW	5/25/2017	0.88	Hail to the size of nickels was reported.
HAMPSTEAD	5/31/2019	1	Quarter size hail was reported.
WALKERS STORE	8/10/2019	1	Dime to quarter size hail was reported. Minor crop damage was also suspected.

TABLE H.5: HEAVY RAIN EVENTS (2000-2019)

Location	Date	Description
Brunswick County		
SHALLOTTE	8/30/2002	Hwy 17 near 4 Mile Road flooded. Public reported numerous other roads flooded.
LELAND	7/3/2004	Nearly four inches of rain fell at Magnolia Greens golf course. Many intersections had 18 inches of standing water.
LELAND	9/1/2004	Significant street flooding was reported with two feet of water on Village Road.

Location	Date	Description
LELAND	9/10/2004	A sheriff reported Hwy 133 flooded near Brunswick Cove nursing home.
SHALLOTTE	10/7/2005	The remnants of Tropical Storm Tammy, in conjunction with a weak upper level disturbance in the Caribbean set up an unusually long and sustained fetch of tropical moisture over the area. The heaviest rain occurred near the coast, where seven to nine inches of rain fell on average over a three day period. Even more rain fell over eastern Brunswick and New Hanover county, where over a foot of rain fell. Over 50 roads in Brunswick county alone were either partially or completely impassable. In New Hanover county, the Cape Fear Museum's basement was completely flooded. Over 46,000 rare artifacts were stored in this area. Many residencial areas had roads replaced by small lakes, with numerous homes and some businesses sustaining minor to moderate flood damage. In Robeson county, State Highway 130 was barricaded due to high water. Pender county also saw flooding, with portions of Highway 117 under water. Much of the monetary damages were due to debris cleanup, road repair, and water damage to homes and businesses.
WINNABOW	9/14/2006	Heavy rain caused Hwy 17 to be nearly impassable at Goodman Branch Rd. Other roads were impassable in Magnolia Greens.
LELAND	8/16/2009	Several roads in the community of Brunswick Forest were flooded. One road had up to two feet of standing water.
HOLDEN BEACH	12/2/2009	There was standing water on Beach Drive, Ocean and Sunset Drive, and Holden Beach Drive.
ASH	9/27/2010	Water covered Ash Road in the town of Ash.
BOLIVIA	9/27/2010	There was flooding in the southbound lane of Interstate 17, west of Boiling Spring Lakes.
EASY HILL	9/27/2010	Street flooding was reported on Westport Drive and Mallory Creek Road.
EASY HILL	9/27/2010	Water covered the road at River Road at Westport Drive and Malory Creek.
FULFORD	9/27/2010	A portion of Gray Bridge Road was washed away.
LELAND	9/27/2010	Several streets were flooded in Leland.
VARNUM	9/27/2010	There was standing water on Zion Hill Road.
RUSSTOWN	12/24/2014	Heavy rain produced flooding on Hwy 17.
MIDWAY	9/3/2015	Over two inches of rain fell in about 90 minutes. Ditches were full.
ELIAH	7/19/2016	Over four inches of rain fell in an hour and a half.
SUPPLY	7/19/2016	Almost three inches of rain fell at the Supply Nature Conservatory.
New Hanover County		
WILMINGTON	9/18/2000	Two accidents occurred due to the heavy rain on the Cape Fear Memorial Bridge. Minor injuries were reported.
WILMINGTON	7/15/2002	911 center reported standing water on many streets. New Center Drive near the overpass at Market Street had 1-2 feet of standing water. Radar estimated between three and four inches of rain fell in this area.
WILMINGTON	8/29/2002	Heavy rain on already saturated soil caused street flooding over much of Wilmington. Old Mill road was under 4 feet of water, with scattered flooding reported in North Chase and other subdivisions north of Market Street. Burnt Mill Creek breached its banks and flooded a large part of Mary Bridge Park off Princess Place Drive.
WILMINGTON	8/30/2002	Flooding reported at the intersection of Carolina Beach Road and Burnet Blvd. Standing water was reported in the Ogden area.
WILMINGTON	8/31/2002	Two to three inches of rain fell on already saturated ground, causing flooding at the corner of Market St and Gordon Rd. Many other roads in the northern portion of the city were flooded.
WILMINGTON	7/29/2004	A foot of water was reported in Kings Grant.
WILMINGTON	8/15/2004	Several neighborhoods were flooded in the Masonboro area. Portions of College Rd. were flooded.
MURRAYSVILLE	9/1/2004	Street flooding was reported on Murraysville road near the Quail Wood community. Road was nearly impassable.

Location	Date	Description
WILMINGTON	9/1/2004	Heavy rain produced street flooding on Oleander Drive and Dawson Street. Flooding was also reported on the 7400 block of Market Street southbound.
WILMINGTON	9/1/2004	Water was entering the buildings on South 2nd Street. Damage, if any, was unknown.
CASTLE HAYNE	9/10/2004	Heavy rain produced low land flooding with one foot of water in parking lots and some yards.
WILMINGTON	9/10/2004	The Wilmington police department reported numerous roads flooded and impassable in the city and surrounding communities.
WILMINGTON	9/14/2004	Off duty NWS employee reported Masonboro Loop nearly impassable with a foot of water on the road.
WILMINGTON	7/13/2005	Flooding was reported on 17th St. and Oleander, as well as Dawson St.
MASONBORO	8/19/2005	Intersection of College Rd. and 17th St. under a foot of water with traffic flow disrupted.
MASONBORO	8/19/2005	Water covered the road at the intersection of College Road and South 17th Street to a depth of one foot. Several nearby lawns had standing water to a depth of eight inches.
WILMINGTON	8/23/2005	Law enforcement reported numerous flooded roadways across Wilmington.
WILMINGTON	8/23/2005	Racine Drive was closed due to flooding. Both Pilgrim Circle and Castle Hayne Road were flooded. Numerous other roads in the county were reported flooded.
WILMINGTON	10/7/2005	
WILMINGTON	11/21/2005	Rainfall amounts of three to four inches produced street flooding in Wilmington and Carolina Beach. Market Street had flooding between College Road and Gorden Road. Many businesses had standing water in their parking lots, with one business sustaining minor water damage. In Carolina Beach, moderate street flooding was observed, with a section of Lake Park Boulevard closed.
WILMINGTON	8/27/2007	Heavy rain produced street flooding along Market Street at the 1500 block. The road was briefly closed. An NWS employee reported six inches of standing water downtown.
WILMINGTON	5/11/2008	A thunderstorm produced two and a half inches of rainfall in an hour at the airport...with over three inches recorded at a Mesonet site.
WILMINGTON	6/22/2008	Flooding was reported on South College Road from New Center Drive to Shipyard.
WILMINGTON	6/22/2008	Heavy rain caused street flooding at Highway 132 and Gordon Road.
WILMINGTON	9/25/2008	A NWS employee reported 2.73 of rain at his residence.
MASONBORO	7/6/2009	Heavy rainfall produced multiple reports of flooded cars and flooded streets. There were several stalled cars on Racine Drive with standing water up to the hoods of the vehicles, and cars were stranded at the 1000 block of Rankin Drive and Wagner Drive.
WILMINGTON	9/22/2009	Heavy rain washed out a driveway in Porters Neck.
MASONBORO	11/11/2009	About half a foot of water was covering the road at the intersection of Pine Grove and Masonboro Loop Road.
WILMINGTON	12/2/2009	Ditches overflowed onto Oleander Road, just east of College Road.
WILMINGTON	12/2/2009	Heavy rain produced eight inches of standing water on 23rd Street between Market and Princess Place. There was standing water on portions of Darlington Ave near Covil Road.
WILMINGTON	12/2/2009	Heavy rain produced street flooding at Murrayville Road between Candlewood and Rockwell Roads. There was also water on Quail Woods Road and Covey Lane.
BAYMEADE	6/2/2010	Three to four inches of rain fell, with standing water on Torchwood Blvd.
NAVASSA	6/2/2010	Heavy rain caused a holding pond to overflow on Landville Trace Rd.
FERNSIDE	9/27/2010	Heavy rain caused some streams to overflow their banks.
SEAGATE	9/27/2010	Street flooding was reported on 58th Street, between Oleander and Roseland Drive.
WILMINGTON	9/27/2010	A small stream near Forrest Hills Elementary School overflowed its banks, flooding Colonial Drive.
MURRAYSVILLE	3/19/2012	Heavy rain produced street flooding on Murrayville Road at the intersections of Pointer and Setter Lanes. The roads were briefly closed.
CAROLINA BEACH	8/1/2012	Heavy rain produced street flooding on Canal Drive in Carolina Beach.

Location	Date	Description
WILMINGTON	8/1/2012	Several inches of standing water were at the intersection of 16th Street and Dawson. Water was also standing at 17th Street and Independence.
CAROLINA BEACH	12/26/2012	Heavy rain caused flooding on South Lake Park Blvd. Flooding was also reported on Lake Drive near Carolina Lake up into the parking lots of local businesses.
WILMINGTON	4/12/2013	About a half a foot of standing water was at the intersection of Dawson and 16th Street. Traffic was at a standstill.
MASONBORO	8/17/2013	A spotter reported flooding in the subdivision of Eagles Nest with standing water in the streets and yards.
MYRTLE GROVE	8/17/2013	Street flooding was reported at the intersection of Carolina Beach Rd and Piner Rd.
WILMINGTON	8/22/2013	Street flooding was reported with stalled cars near New Hanover High School.
Onslow County		
SWANSBORO	9/27/2010	Storm total rainfall of 21.65 inches reported by an observer.
FOLKSTONE	5/30/2012	An observer reported 0.92 inches in an hour and a half with heavy ponding on nearby roads.
Pender County		
HAMPSTEAD	9/14/2004	A meteorologist reported two feet of water in several residents' yards.
HAMPSTEAD	10/7/2005	
TOPSAIL	9/22/2009	Street flooding was reported at the intersection of Hwy 17 and Sloop Point Road.
HAMPSTEAD	11/11/2009	Hwy 210 eastbound in eastern Pender County was closed due to flooding. Olde Point and Country Club Road were also closed to standing water.
BURGAW	8/22/2010	Over six inches of rain produced minor flooding over portions of interior Pender County.
CURRIE	6/7/2013	Water covering the road at the intersection of Hwy 421 and Hwy 210.
MARLBORO	6/23/2013	Heavy rain caused part of a private road to be washed out near Sycamore Rd in Castle Hayne.
ROCKY PT	6/23/2013	Multiple roads had standing water including US Hwy 117 near Rocky Point.

TABLE H.6: HEAVY SNOW EVENTS (2000-2019)

Date	Description
Onslow County	
1/20/2009	Rain changed to snow around 9 am and continue into the late evening hours. Snow accumulated 2 to 3 inches across the county.
2/12/2010	Reports thoughout the county of 6 to 8 inches of snowfall.
12/26/2010	Widespread snow developed during the morning hours and continued into the early evening. Total snow accumulations ranged from 3 to 4 inches over most of the county with 2 inches or less closer to the coast. One fatality occurred during the morning in an automobile accident due to slippery roads.
1/10/2011	Snow accumulations of 3 to 5 inches reported across the entire county.

TABLE H.7: HIGH WIND EVENTS (2000-2019)

Date	MPH	Description
		New Hanover County
3/24/2013	51	A 59-mph gust was recorded at the Johnny Mercer Pier.
3/24/2013	51	A 59-mph gust was recorded at the Oceanic Restaurant.
3/24/2013	58	A 67-mph gust was recorded at the Oceanic Restaurant.
3/7/2014	53	A 61-mph wind gust was estimated by a spotter in Kure Beach. A few minutes earlier, a 56-mph gust was estimated.
10/4/2015	53	The wind instrumentation at Johnnie Mercer's Pier measured a wind gust to 61 mph.
4/26/2019	61	Nearly a dozen trees were blown down along US-117 in the Northchase neighborhood.
		Onslow County

Date	MPH	Description
12/16/2000	47	On the morning of December 17th, a strong cold front moved across Eastern North Carolina followed by a very powerful high pressure system. As the high pressure moved into the region, afternoon non-thunderstorm winds of 40 to 50 mph caused some minor damage to street lights and outdoor signs. Two boaters were lost that morning in the New River when their fishing boat capsized in the high wind.
3/13/2001	47	Strong northeast winds of 50 to 60 mph caused minor damage in coastal counties and along the Outer Banks. The worst damage reported was a roof that had been blown off of a business in Onslow County.
3/20/2001	52	Strong northeast winds of 55 to 60 mph effected the Crystal Coast as well as the Outer Banks. A roof was destroyed on a home in Onslow county when a tree fell on the residence.
1/6/2002	54	Strong non-convective winds of 60 to 70 mph impacted the Crystal Coast and Outer Banks during the afternoon of March 6, 2001. No damage was reported; however, trees were reported down in some areas as well as numerous power outages.
2/4/2002	34	Strong high pressure moved into Eastern North Carolina during the evening hours of February 4th creating sustained winds along the coast of 40 to 50 mph. No damage was reported.
3/7/2004	55	A cold front moved through producing strong damaging winds across much of the area during the late evening hours on March 7th. Wind gusts ranged from 50 to 72 miles per hour causing minor structural damage. Many trees and power lines were downed as a result of the strong winds.
2/28/2005	59	High winds associated with a coastal low-pressure area resulted in a 68-mph wind gust at Risely Pier in Onslow County, and a 60 mph wind gust at the Cedar Island Ferry.
5/6/2005	52	Report from Jacksonville.

TABLE H.8: ICE STORM EVENTS (2000-2019)

Date	Description
	Brunswick County
2/24/2015	Precipitation began as snow before dawn, accumulating around two tenths of an inch. The precipitation transitioned to freezing rain by late morning, with a report of a quarter inch of ice accumulation west of the town of Leland.
	New Hanover County
2/24/2015	Precipitation began as snow before dawn, accumulating around two tenths of an inch along the coast. The precipitation transitioned to freezing rain by late morning, with reports ranging from a tenth of an inch to as much as a quarter inch of ice accumulation along the northeast coast of New Hanover county.
	Onslow County
2/16/2015	A quarter inch of freezing rain observed across the northwestern part of the county. Some tree limbs were brought down by the weight of the ice.
	Pender County
2/24/2015	Precipitation began as snow before dawn, accumulating as much as .4 in the town of Hampstead. The precipitation transitioned to freezing rain by late morning, with reports of a quarter inch of ice accumulation along the entire coast.

TABLE H.9: LIGHTNING EVENTS (2000-2019)

Location	Date	Description
		Brunswick County
SHALLOTTE	6/6/2000	Lightning struck the electric transformer near Atlantic Telephone's main switch exchange, interrupting local telephone and Internet service for over 34,000 customers. The lightning knocked out the company's main power source, their generator, and exchange air conditioner.
LELAND	5/31/2003	Lightning struck a house in the 100 block of Rampart Street, starting a fire that burned half the house and totaled three automobiles.
SHALLOTTE	7/17/2004	A man walking along the beach at Bird Island was struck by lightning and was killed.

Location	Date	Description
LONG BEACH	8/14/2005	Lightning struck two homes in Long Beach. Minor damage to the interior of the homes was reported.
SHALLOTTE	8/14/2005	Lightning struck three houses with minor roof damage. A riding lawn mower was also damaged.
SECESSION	3/1/2009	Local law enforcement reported lightning struck a home in Holden Beach. The strike caused some structural damage and broke some windows.
SOUTHPORT	6/5/2011	Lightning strikes downed two trees in Southport.
MILL CREEK	8/22/2011	A house was struck by lightning on Westwood Road.
SOUTHPORT	3/19/2012	Lightning struck a house in the 4300 block of Gauntlet Drive. Lightning also struck a tree and set it ablaze at the intersection of Gauntlet Drive and St James Drive.
FT CASWELL	4/4/2012	Lightning destroyed a vacation home on 1 Palmetto Road on Bald Head Island. No one was in the house at the time.
BOWEN PT	5/14/2012	Lightning started a fire that caused moderate structural damage to a home on Mary Sheldon Road. The roof was damaged, but the house remained standing. No one was in the home at the time.
FT CASWELL	8/12/2012	Lightning struck a house at 27 Mourning Warbler Court, setting the third floor on fire. Renters of the home were able to escape without injury.
CASWELL BEACH	10/15/2012	Lightning started a house fire on SE 69th Street in Oak Island. The three-story beach home was badly damage. No one was home when the fire started.
MILL CREEK	6/3/2013	Lightning struck a house on South Shore Drive near Longwood Road.
EASY HILL	8/20/2013	Lightning struck a house on the 200 block of E Wood Lane. A teenager received a burn from a gaming system inside the home.
EASY HILL	8/20/2013	Lightning struck a storage building on the 600 block of Hickory Branches Ln.
VARNUM	6/15/2014	Lightning struck the Zion Hill Baptist Church, entering through a phone line. The lightning caused some electrical damage, as well as one minor injury.
SOUTHPORT	7/15/2014	A house was struck by lightning in Southport and was heavily damaged. Three firefighters had to be treated following the blaze.
VARNUM	8/3/2014	Lightning struck a house on 2949 Serrano Trail, causing moderate damage.
BISHOP	6/9/2015	Lightning struck a tree, which fell on power lines.
EASY HILL	7/23/2015	Lightning caused smoke and fire damage at the Waterberry Plantation Clubhouse in Leland.
LANVALE	7/23/2015	Lightning started a fire at 1806 Evangline Drive in Brunswick County. The fire burned the entire roof of the house.
THOMASBORO	4/5/2017	Lightning started a structural fire on Kirkcaldy Ct. The extent of the damage is estimated.
ELIAH	7/3/2019	Lightning started a fire at a home on Lapham Dr in Leland.
LANVALE	7/3/2019	Lightning damaged a home on Pullen Dr in Leland.
New Hanover County		
WILMINGTON	8/11/2000	Lightning stuck a home on Avenshire Circle, setting it ablaze. A fire captain estimated the damage at $100,000. Lightning also struck a shed behind a private home on Meares Street, causing approximately $6000 in fire damage.
WILMINGTON	6/16/2001	Lightning struck an apartment unit, starting a fire.
CAROLINA BEACH	7/6/2002	Lightning struck the beach near the Sandpiper Lane public beach access, injuring a lifeguard and two other people near the area, none seriously.
WILMINGTON	7/20/2002	A women was injured when struck by lightning and was sent to the hospital.
WRIGHTSVILLE BEACH	4/7/2003	Lightning started a fire at a large oceanfront home in Wrightsville Beach.
WILMINGTON	3/5/2005	Lightning damage several buildings downtown. Numerous limbs were blown down.
WRIGHTSVILLE BEACH	7/13/2005	Lightning struck near a lifeguard on Wrightsville Beach. The lifeguard suffered muscle spasms and was treated and released at the local hospital.
CAROLINA BEACH	8/14/2005	Lightning struck the beach at Bald Head Island, injuring nine people. Seven were treated at the local hospital for tingling feelings. One boy was in cardiac arrest when rescue units

Location	Date	Description
		arrived and was revived at the scene. Another boy was knocked unconcious and was also revived at the scene. All the victims were out of the water and on the sand at the time of the strike.
WILMINGTON	7/28/2007	Lightning struck a home on Gorham Ave., heavily damaging the home.
WILMINGTON	7/28/2007	Lightning struck an apartment complex on Hearthside Drive, heavily damaging it. Heavy rain also caused street flooding on Dawson Street, Medical Center Drive, and parts of College Road. About 1400 customers lost power.
WILMINGTON	6/26/2009	Lightning struck a house on North Bend Road in Ogden, setting it on fire. Around the same time, another home was struck on Kauri Street in the subdivision of Porters Neck, causing damage.
WILMINGTON	6/27/2009	Lightning struck a home on the corner of Shinn Creek Lane and Wescott, causing damage to the roof and some of the windows.
WRIGHTSVILLE BEACH	9/25/2009	A thunderstorm moved quickly into the Wrightsville Beach area, and lightning struck a young man swimming near the Crystal Pier.
SEAGATE	8/18/2010	Lightning struck a NWS employee's house, causing some structural damage and a fire.
EAST WILMINGTON	8/19/2010	Lightning struck a house at 5119 Somersett Lane, causing significant damage.
SEAGATE	5/13/2011	Lightning caused a structural fire on Oakcrest Drive.
SEAGATE	6/29/2011	Lightning struck a home 236 Spruce Drive.
WILMINGTON	7/10/2012	Lightning damaged a tree and a fence on Jackson Street.
BAYMEADE	7/23/2012	Lightning started a fire in Ogden Park. The fire spread and the park had to be evacuated.
CASTLE HAYNE	8/19/2012	Lightning struck and killed a man while fishing on the Northeast Cape Fear River near Castle Hayne.
KIRKLAND	12/26/2012	Lightning caused extensive fire damage to a house on Bonaventure Drive.
MYRTLE GROVE	8/23/2013	Lightning struck a home on 111 Pitch Pine Court, starting a fire. All indications are that significant damage was done before fire crew could put out the fire.
MYRTLE GROVE	9/2/2013	Lightning struck the roof of a home in Myrtle Grove. A small fire caused minor roof damage.
HARBOR IS	7/15/2014	Lightning struck a home on Turnberry Place in Landfall.
MYRTLE GROVE	7/15/2014	Lightning struck a house on 6201 Amble Side Drive. No fire was reported, but the lightning left a hole in the side of the house.
SEA BREEZE	7/15/2014	Lightning struck a home on Palmer Way. The house caught fire and was a total loss.
SEA BREEZE	7/15/2014	Lightning struck a house on Hogan Court.
BAYMEADE	6/19/2015	Lightning struck a house that started a fire on White Rd.
MYRTLE GROVE	12/24/2015	A man was taken to the hospital after he was struck by lightning on the 300 block of Burbank Road. His injuries did not appear life threatening.
HARBOR IS	7/14/2016	An ocean rescue vehicle was struck by lightning on Wrightsville Beach. The lightning also deflected and struck a woman. She broke her ankle and was dazed. The vehicle sustained electrical damage and would not start.
WILMINGTON	7/12/2018	Lightning started a structural fire on Keaton Ave in downtown Wilmington.
Onslow County		
SWANSBORO	5/28/2001	Lightning struck 3 homes in Swansboro causing fire damage.
ERVINTOWN	8/22/2010	Shed struck by lightning and burned down.
ERVINTOWN	9/7/2011	Law enforcement reported a house was struck by lightning on Haw Branch Road causing minor damage.
Unincorporated Area	7/11/2017	Two marines were struck by lightning while working on aircraft at New River MCAS. One of the marines passed away several days later due to serious injuries sustained from the lightning strike.
Pender County		

Location	Date	Description
SURF CITY	7/2/2001	Emergency manager reported that lightning struck a house in Surf City, south of the drawbridge.
SURF CITY	7/11/2001	Lightning struck a house on Oak Drive, punching charred holes in the roof and damaging most electrical appliances.
BURGAW	1/31/2006	Lightning struck a house, damaging the roof and exterior of the home. The lightning also damaged many electrical outlets within the home, and a telephone box.
TOPSAIL	7/7/2008	During a thunderstorm, four people took refuge under a house on Lea Island. A boy was struck by lightning and was killed. Three others were indirectly struck by lightning and were transported to the hospital. They reportedly were not seriously injured.
HAMPSTEAD	7/23/2009	Lightning struck a home on Saint John's Church Road. The house sustained very minor damage, and a microwave oven was destroyed.
SCOTTS HILL	6/29/2011	Lightning struck a home on 300 North Beach Road. Damage is unknown.
SLOOP PT	9/2/2013	A man and his wife were walking on the beach near South Shore Drive in Surf City when they were struck by lightning. It appears the man was struck directly, and the woman received only a minor shock. The man was knocked unconscious, but was revived about six minutes later and taken to the hospital for severe burns. Days later, he is alive but still recovering from his injuries. The woman had minor burns and was not hospitalized.
ASHTON	8/18/2014	Lightning caused a structural fire on Double Eagle Road.
SLOOP PT	7/23/2015	Lightning started a fire at 1601 South Shore Drive in Surf City.
NEW TOPSAIL BEACH	7/3/2016	Lightning injured four people at South Topsail Beach. After three people were transported, a police officer responding to the scene was also struck.
HAMPSTEAD	6/11/2018	Lightning struck a house in Hampstead, causing a large fire.

TABLE H.10: THUNDERSTORM EVENTS (2000-2019)

Location	Date	MPH	Description
Brunswick County			
LONGWOOD	5/25/2000	60	Brunswick 911 reported dime size hail, and a spotter reported a wind gust blew trees and power lines down. In addition, the roof of the Indigo Plantation clubhouse was damaged.
SHALLOTTE	7/21/2000	55	Brunswick 911 reported a large billboard was blown down.
WINNABOW	4/1/2001	55	Large tree was blown across a road.
LONGWOOD	8/29/2001	52	A spotter estimated a 60-mph wind gust knocked trees down along Ash Little River Road.
LELAND	5/10/2002	60	Spotter reported several trees down in the Magnolia Greens area.
WINNABOW	6/14/2002	55	Sherriff reported trees down.
LELAND	7/20/2002	56	Spotter estimated thunderstorm wind gusts to 65 mph. The winds damaged a steel frame house under construction. Dime size hail was also reported with this storm.
MACO	8/24/2002	55	Large tree limbs down.
WINNABOW	2/22/2003	55	Trees down on power lines.
LELAND	7/9/2003	60	The fire department reported trees down.
LELAND	6/3/2004	61	Wind gusts were estimated at 70 mph at the Magnolia Greens golf course. Patio furniture was blown 30 yards, and there was some shingles torn off of a house.
LELAND	7/17/2004	60	A Brunswick sheriff reported a large tree down blocking the entire roadway.
SOUTHPORT	7/17/2004	65	The public reported trees down off of Hwy 133 near Orton Plantation.
LANVALE	3/8/2005	60	Leland police reported several trees down.
WINNABOW	4/17/2006	60	Trees down. There was some reported flooding on Hwy 17.
LONGWOOD	7/15/2006	52	Numerous large limbs were blown down.
LELAND	4/15/2007	61	NWS Storm Survey concluded straight line winds to near 70 mph caused minor damage to approximately 12 homes along Port Royal Road, just north of the intersection with

Location	Date	MPH	Description
			Northwest Road NE. The damage was caused primarily by downed trees, some up to 16 inches in diameter. Spotty minor damage continued for approximately one quarter mile to the northeast near the intersection of Goose Neck Road and Little Trail. A garage door and an air conditioning unit were damaged in this area.
LONGWOOD	6/20/2008	50	A large tree was blown down at the intersection of Etheridge Road and Longwood Road.
PINEY GROVE	6/21/2008	52	A very large pine tree was uprooted.
VARNUM	6/21/2008	52	Thirteen large trees were blown down. The report was relayed via Brunswick County 911 Center.
MAKATOKA	7/31/2008	52	Several trees were reported down along Makatoka Road NW, about 1 mile south of SR 1340.
VARNUM	6/26/2009	52	A large oak tree fell onto a house in the community of Lockwood Folly Country Club.
BISHOP	12/2/2009	50	A large tree fell onto a power line near the intersection of Maco Road and Hunters Ridge Drive.
SHALLOTTE	1/25/2010	52	A large gas station canopy was blown off. Minor damage to a home including damage to a screened in porch, shutters and a mailbox. A large trampoline was carried by the wind causing damage to a few vehicles. Six trees were reported down. Time was estimated based on radar.
SEASIDE	8/6/2010	56	A hand held anemometer measured a wind gust to 64 mph.
GORES LNDG	9/30/2010	56	Trees were reported down.
LONG BEACH	9/30/2010	62	Ocean Crest Pier, a CORMP station, measured a wind gust to 62 knots.
MACO	9/30/2010	50	Trees were reported down.
ASH	4/5/2011	56	A large tree was reportedly down and blocking traffic on Ash Little River Road NW, near Whiteville Road NW.
MILL CREEK	4/5/2011	56	Trees were reportedly down on power lines near the intersection of East Boiling Spring Road and Argonne Road.
NORTH WEST	4/5/2011	61	A wind gust to 70 mph was measured by a trained spotter in the community of Northwest.
HONEY POND	7/24/2011	50	A tree was reportedly down on Longwood Road near the intersection with Hughes-Smith Road.
FREELAND	8/20/2011	56	A National Weather Service Storm Survey Team concluded a microburst with winds to 65 mph downed large limbs and some trees just to the west of Kingtown Road. A couple of the larger trees appeared to be rotted and there were a few shallow rooted 8 to 10-inch diameter ornamental trees uprooted. There was also minor roof damage to about 6 homes and a greenhouse also sustained minor damage. Just to the east of Kingtown Road, a metal canopy attached to a metal building was blown off. Windows were reportedly blown out of a house. The roof of a shed was torn off and blown onto a car. The maximum path width was 0.8 miles. The path length was 334 yards.
MILL CREEK	8/22/2011	50	A tree was blown down onto a mobile home on Sycamore Road.
SOUTHPORT	12/27/2011	59	Wind gust to 68 mph was measured.
BOWEN PT	5/14/2012	50	A large tree was reported down across Mary Sheldon Drive SW.
CAMP BRANCH	7/1/2012	52	A National Weather Service Storm Survey team found several snapped pine trees along Highway 211. The diameter of these trees was up to 12 inches.
CAUSE LNDG	7/1/2012	50	Large limbs were reported down on East 2nd Street.
HOLDEN BEACH	7/1/2012	50	Thunderstorm winds created some flying debris. This debris did cause lacerations to one person. The person was transported to the hospital for evaluation.
LELAND	7/1/2012	52	Several trees and power lines were reported down along Old Mill Road.
SUPPLY	7/1/2012	52	A National Weather Service Storm Survey team found several pine trees snapped near the Lockwood Folly Athletic Complex. The diameter of these trees was up to 12 inches.
SUPPLY	7/1/2012	52	Trees were reported down along and near Southport-Supply Road.

Location	Date	MPH	Description
SUPPLY	7/1/2012	50	Trees were reported down along Stone Chimney Road.
MILL CREEK	10/7/2012	50	Several trees and a power line were reportedly down on East Boiling Spring Road near Pretty Pond. The time was estimated based on radar data.
MILL CREEK	10/7/2012	50	Several trees were reportedly down near the intersection of Daws Creek Road and River Road. The time was estimated based on radar data.
SOUTHPORT	12/26/2012	54	A thunderstorm wind gust to 62 mph was measured. The equipment is mounted on a tower about 45 feet above ground level.
SOUTHPORT	12/26/2012	59	A thunderstorm wind gust to 68 mph was measured. The equipment is mounted on a tower about 45 feet above ground level.
SOUTHPORT	1/31/2013	51	A mesonet site measured a wind gust to 59 mph. The equipment is mounted 45 feet above ground level.
PINEY GROVE	6/3/2013	50	A large tree was reported down across Rosa Trail near the intersection with Old Ocean Highway.
WINNABOW	6/27/2013	50	A tree was reported down. The time was estimated based on radar data.
CAUSE LNDG	4/30/2014	50	A tree reportedly fell on a car. The fire department was dispatched.
COOL RUN	8/16/2014	50	Trees were reported down.
SUPPLY	5/21/2015	56	Several trees were reported down near the intersection of Gilbert Road and Benton Road. The time was estimated based on radar data.
BOLIVIA	7/23/2015	52	A wind gust to 60 mph was measured.
PHOENIX	7/23/2015	52	A metal roof was partially blown off a trailer on John Davis Road NE.
CAMP BRANCH	5/3/2016	50	Large tree limbs were reportedly down on Freeman Road.
EASY HILL	7/19/2016	56	Several trees were reported down along Cottonwood Lane.
PINEY GROVE	7/19/2016	54	Two trees were reportedly down off Midway Road between Boat Lane and Zachary's Path. The time was estimated based on radar data.
RED BUG	2/15/2017	61	A survey conducted by the National Weather Service found evidence of a microburst with winds of 60 to 70 mph, mainly near the Shallotte Fire Training center. The damage occurred over a broad, but short swath. There was damage observed to a large number of vinyl fences in the community near the fire station.
RUSSTOWN	2/15/2017	56	A carport was heavily damaged.
SOUTHPORT	2/15/2017	52	Trees were reported down.
MILL CREEK	6/15/2017	52	Several trees were reported down on George II Highway near the intersection with Martinville Dr. The time was estimated based on radar data.
EASY HILL	4/19/2019	52	Some trees were snapped in Leland.
SECESSION	4/19/2019	56	Some trees were snapped.
CASWELL BEACH	6/20/2019	52	A Wunderground station at Caswell Dunes recorded a 60-mph gust.
ASH	6/22/2019	61	Several large trees down near Ash.
New Hanover County			
WILMINGTON	2/14/2000	54	62 mph thunderstorm gust measured at the National Weather Service ASOS site at the Wilmington Airport.
WRIGHTSVILLE BEACH	4/18/2000	61	Wrightsville Beach fire station measured a 69 mph wind gusts with their wind equipment.
WILMINGTON	8/24/2000	50	An anemometer at the North Carolina State Port measured a 58-mph wind gust that caused significant damage to a crane.
WRIGHTSVILLE BEACH	4/1/2001	77	Wind equipment at Wrightsville Beach measured an 89-mph wind gust.
WILMINGTON	6/7/2001	60	Ogden Fire Dept. reported trees down on Bayshore Drive. A NWS employee drove to the location and observed several trees down. The newspaper reported that 3000 customers were without power due to the storm.

Location	Date	MPH	Description
WILMINGTON ARPT	6/7/2001	62	The ASOS at the Wilmington airport measured a 71-mph wind gust. A NWS employee observed several trees down in the area.
WILMINGTON	5/10/2002	53	Television station reported trees down. A wind gust of 62 mph was recorded at State Port. The strong winds and lightning caused power outages for approximately 4600 residents in the county.
WILMINGTON	6/14/2002	78	National Weather Service storm survey concluded a microburst with estimated 80-90 mph winds caused widespread damage along a path approximately 1/2-mile-long with a maximum width of 50 to 100 yards. Wrightsboro Elementary School sustained three broken windows. Portions of school's metal roof were peeled back or were torn off and blown 50 yards from the building. One trailer was blown off its concrete blocks. Seventeen houses sustained damage along Long Leaf Drive. Damage included shingles blown off roofs, siding torn off houses or significant damage to porches. An 18-inch diameter tree was snapped off about 20 feet above ground level, with numerous other trees uprooted. Fallen trees and limbs damaged power lines and at least 4 cars. No injuries were reported.
WILMINGTON	6/14/2002	65	New Hanover 911 reported that thunderstorm winds caused a building to partially collapse on Front Street. Trees were also reported down.
WILMINGTON	7/20/2002	55	911 dispatch reported a large tree fell on a vehicle.
WRIGHTSVILLE BEACH	11/12/2002	50	Wrightsville Beach police department reported a measured 58 mph wind gust.
WRIGHTSVILLE BEACH	2/4/2003	51	A measured 59 mph wind gust was recorded at the Oceanic Pier in Wrightsville Beach.
WILMINGTON	3/20/2003	51	A measured 58 mph wind gust was recorded at the state port.
WILMINGTON ARPT	5/8/2003	62	The ASOS at the Wilmington Airport measured a 71-mph wind gust.
WILMINGTON	5/31/2003	87	A NWS storm survey concluded a microburst produced estimated 100 mph wind gusts, causing extensive damage to many homes in the Brittany Woods subdivision. Nearly 100 homes sustained at least some damage. The more serious damage occurred to half a dozen homes when their garage doors were blown in, allowing the wind to blow portions of walls and/or roofs away. One home sustained extensive damage when a fence was demolished, with the projectiles blown through the house's walls. A large travel trailer and an RV motor home were overturned, and an SUV and an attached trailer were turned around. The storm continued east southeast, with numerous trees and power lines reported down. The thunderstorm dropped penny to nickel size hail 3 miles northeast of Wilmington and 7 miles north of Wilmington, as well as 3 miles east of Murraysville. More penny size hail was reported in Wrightsville Beach, as the storm finally moved offshore.
MURRAYSVILLE	7/9/2004	55	Pine trees were blown down.
WILMINGTON	3/5/2005	51	A 58-mph wind gust was measured at the Wilmington airport.
MYRTLE GROVE	3/8/2005	77	A NWS Mesonet site measured an 89 mph wind gust.
WILMINGTON	3/8/2005	77	The Wilmington ASOS measured an 89-mph wind gust. A private hangar at the airport was damaged, and a man in Wilmington was injured. In downtown Wilmington, a section of the roof of city hall was damaged, and an historic home, built in 1738, was moderately damaged when a chimney collapsed. The Oceanic pier also measured a 69-mph wind gust.
WILMINGTON	4/3/2006	60	Trees down at Airlie and Military Cutoff Rds.
CASTLE HAYNE	4/17/2006	63	
WRIGHTSVILLE BEACH	6/12/2006	58	A 66-mph wind gust was recorded at the Oceanic restaurant.
WILMINGTON	7/15/2006	51	

Location	Date	MPH	Description
WILMINGTON	7/15/2006	60	Large tree down in the road near North Kerr Ave. and Gordon Rd.
WILMINGTON	8/8/2006	60	The event began with penny size hail reported at the intersection of Market St. and 27th St. A large tree fell at the corner of Greenville Loop Rd. and Wrightsville Ave. Power lines were down at Carolina Beach Rd. and Shipyard Boulevard.
FERNSIDE	6/22/2008	52	A large tree fell onto a new car on Lullwater Drive. The car reportedly sustained some damage, but no estimate was given.
MURRAYSVILLE	6/22/2008	52	A few oak and pine trees were snapped along Fallen Tree Court. Some of the trees were described as large.
SOUTH WILMINGTON	7/10/2008	50	A swing set was damaged in the Pine Valley neighborhood. A large tree was also uprooted.
WILMINGTON	4/11/2009	52	Large limbs and a few trees down along Orange Street, Rankin Street and Castle Street in downtown Wilmington. One large limb fell on a house causing minor damage.
KIRKLAND	6/27/2009	50	Several trees were snapped along Porters Neck Road. The trees were snapped from one-half to 4 feet off the ground.
WILMINGTON	6/23/2011	65	ASOS equipment at the Wilmington International Airport measured a wind gust to 75 mph. A National Weather Service Storm Survey Team confirmed a microburst with a path length of up to 400 yards northeast of the ASOS. Four tree limbs were broken and one tree was down. A street sign was detached and damaged, blown about 100 yards from where it had been posted.
AIRLEE	6/29/2011	54	A tree was reported down near the intersection of Wrightsville Avenue and Oleander Drive. The time was estimated based on radar data.
HARBOR IS	6/29/2011	50	NOS station on Johnnie Mercer's Pier measured a wind gust to 58 mph.
SEAGATE	6/29/2011	50	A large tree was reported down near the 5600 block of Oleander Drive. The time was estimated based on radar data.
SEAGATE	6/29/2011	50	A tree was reported down along Park Avenue.
SOUTH WILMINGTON	6/29/2011	56	A tree was reported down across Henry H Watters Drive. The time was estimated based on radar data.
SOUTH WILMINGTON	6/29/2011	62	A wind gust to 71 mph was measured about 65 feet above the ground at the North Carolina State Port. A container crane was moved about 150 yards by the wind gust. Six box containers were blown off of their stacks. Two garage doors were also blown in. The damage was likely the result of a microburst.
MURRAYSVILLE	7/21/2011	50	A large pine tree was reportedly uprooted on Sidbury Road.
WILMINGTON	7/1/2012	61	A trained spotter estimated a 60 to 70 mph wind gust.
KURE BEACH	12/26/2012	61	The National Weather Service conducted a survey and concluded a microburst with winds to 70 mph damaged a convenience store located on the corner of Fort Fisher Boulevard and Avenue K. Two large windows were blown out and two large outdoor ice machines were toppled.
WILMINGTON	1/31/2013	50	A large tree was reported down across an unoccupied vehicle on North 10th Street. The fire department was en route.
HARBOR IS	6/30/2013	53	A 61 mph thunderstorm wind gust was measured at Johnny Mercer Pier.
WILMINGTON	6/18/2015	54	A 62 mph thunderstorm wind gust was measured by the ASOS equipment at the Wilmington International Airport.
BAYMEADE	6/18/2015	52	Several large limbs blown down and a large bench swing blown over and damaged.
CASTLE HAYNE	6/18/2015	50	A tree was reportedly snapped in half in a yard on Blue Clay Road.
SEAGATE	6/18/2015	56	A three foot diameter oak tree was toppled onto a house.
FERNSIDE	6/19/2015	56	A portion of metal roofing was blown off a car dealership. The roofing materials then landed on some of the cars in the lot and damaged them. The time was estimated based on radar data.
FERNSIDE	7/23/2015	78	A survey conducted by the National Weather Service concluded a microburst with winds up to 90 mph produced considerable damage in Wilmington, North Carolina.

Location	Date	MPH	Description
			The damage path began on the premises of Colonial Parke Apartments on Hunt Club Road. A two foot diameter tree was uprooted and crashed through the roof and window of a second story apartment causing severe damage. Three other apartments in the complex sustained damage. The damage path continued across Market Street to just northeast of the Market Street and North College Road intersection. Numerous branches from 6 to 10 inches in diameter were broken from trees. A couple stores within a shopping center sustained damage to include ceiling tiles, windows and store merchandise. As the microburst crossed Market Street, it lifted a large rooftop HVAC unit from Bonefish Grill and deposited it 30 yards away. The HVAC unit landed inside a neighboring storage unit facility after breaking down a garage door. Damage continued east along Market Street to just beyond North College Road where a small portion of the roof of Builders First Source was lifted off. Several buildings along the path of this microburst sustained damage ranging from minor shingle loss to partial roof loss. Most of the damage was consistent with 75 to 80 mph wind speeds, however the HVAC damage was consistent with a maximum wind speed of 90 mph. The path length was about eight-tenths of a mile and the maximum path width was 200 yards. There were no reports of injury or death although some people did have to seek safe shelter as the severe winds hit. More than 3000 people were briefly without electricity.
SOUTH WILMINGTON	6/17/2016	50	Isolated tree damage was observed in several neighborhoods on either side of South College Road.
WILMINGTON	7/8/2016	50	KILM ASOS reported a squall with a measured wind gust to 58 mph.
MYRTLE GROVE	2/15/2017	50	A large pine tree was reportedly snapped at the base.
CAROLINA BEACH	5/25/2017	51	Several small amusement rides were blown over. Damage to roofing shingles and signs. The time was estimated based on radar data.
KURE BEACH	5/25/2017	51	A wind gust to 51 knots was measured on Fort Fisher Blvd.
BAYMEADE	7/22/2018	52	An officer reported a large limb down on New Center Dr.
WILMINGTON	7/23/2018	52	Power lines were reported down on Castle St, and 18th St.
WILMINGTON	12/20/2018	52	A tree was blown down on Waltmoor Rd. A power pole was snapped at the corner of Bethel and Amber Rd.
MYRTLE GROVE	6/2/2019	52	Portions of a fence was blown down and flag pole was blown down in the Deer Hill neighborhood.
SEA BREEZE	6/2/2019	52	A large tree fell on a car in the Sea Breeze Community.
SEA BREEZE	6/2/2019	56	A tree was blown down across the road. Fences were also blown down along Hill Valley Walk. The power was out in the area.
EAST WILMINGTON	7/3/2019	52	A large tree was blown down at the 3900 block of Peachtree Ave.
WILMINGTON	9/9/2019	56	There was some minor roof damage to the Wilson Center.
Onslow County			
RICHLANDS	6/22/2000	55	
SNEADS FERRY	12/17/2000		A severe thunderstorm moved across eastern Onslow county blowing down a large oak tree that destroyed a trailer.
CATHERINE LAKE	4/1/2001	56	Thunderstorm wind blew the roof off of a house, destroyed a barn, and knocked a mobile home off its foundation in Catherine Lake.
HUBERT	4/1/2001	61	Estimated wind speeds of 70 mph knocked down numerous power lines and trees in and near Hubert and Stella.
SWANSBORO	8/28/2001	52	
HALF MOON	6/14/2002	61	A mobile home was destroyed when a large pine tree fell in about 70 mph wind.
SNEADS FERRY	7/5/2002	52	
CAMP LEJEUNE	7/10/2002	62	Thunderstorm winds around 70 mph blew down numerous trees on Camp Lejeune, one of which totaled a truck. Flying debris damaged several other vehicles.

Location	Date	MPH	Description
PINEY GREEN	7/10/2002	62	Severe thunderstorm winds ripped the siding off of several homes in Piney Green.
BELGRADE	7/20/2002	52	Numerous trees and power lines down in and around Belgrade.
RICHLANDS	7/20/2002		Falling trees and limbs caused damage to a mobile home in Richlands.
CAMP LEJEUNE	7/31/2002	56	
JACKSONVILLE	8/20/2002	52	
NORTH TOPSAIL BEACH	11/12/2002	52	
SWANSBORO	11/12/2002	54	
JACKSONVILLE	2/22/2003	50	Local media reported trees down along Highway 17.
JACKSONVILLE	7/17/2003	50	Onslow county 911 center reported trees down on Haws Run Road.
HUBERT	7/9/2004	50	Public reported a gazebo blown over.
JACKSONVILLE	7/11/2004	50	Spotter reported trees down near intersection of Highway 24 and Western Boulevard.
RICHLANDS	3/8/2005	50	A line of severe thunderstorms moved through much of North Carolina during the morning and early afternoon hours of March 8th. In general, Eastern North Carolina experienced straight-line wind gusts from 50 to 90 mph. A wind gust of 110 mph was recorded at Kill Devil Hills on the Outer Banks of Dare County where significant structural damage occurred, including the destruction of a communications tower. Sporadic to widespread wind damage occurred across the entire area with numerous trees and power lines down, and minor to significant structural damage. There was one injury in Hyde County when a mobile home was overturned and demolished by the fierce winds.
SWANSBORO	3/8/2005	53	A line of severe thunderstorms moved through much of North Carolina during the morning and early afternoon hours of March 8th. In general, Eastern North Carolina experienced straight-line wind gusts from 50 to 90 mph. A wind gust of 110 mph was recorded at Kill Devil Hills on the Outer Banks of Dare County where significant structural damage occurred, including the destruction of a communications tower. Sporadic to widespread wind damage occurred across the entire area with numerous trees and power lines down, and minor to significant structural damage. There was one injury in Hyde County when a mobile home was overturned and demolished by the fierce winds.
JACKSONVILLE	7/28/2005	50	Large trees down in Deerfield off of Gumbranch Road.
CAMP LEJEUNE	8/23/2005	51	
CAMP LEJEUNE	4/17/2006	52	60 mph wind gust measured near camp gate on Highway 172.
JACKSONVILLE	5/26/2006	50	Power lines down.
RICHLANDS	5/26/2006	60	Trees down on several homes.
SWANSBORO	6/3/2006	50	
HUBERT	7/15/2006	51	
HALF MOON	7/23/2006	51	
GREGORY FORKS	3/4/2008	50	Tree blown down onto power line on Gregory Fork Road.
HUBERT	3/5/2008	50	Strong wind gust ripped siding off a house.
SHELL ROCK LNDG	3/5/2008	68	Person near Hammocks Beach reported a measured wind gust of 78 mph.
ERVINTOWN	4/12/2008	50	Trees blown down near Loise Lane near Richlands.
BELL FORK	6/1/2008	52	Wind gust of 60 mph reported by trained spotter.
CAMP LEJEUNE	6/29/2008	52	Trained Spotter reported wind gust to 60 mph on Gum Branch Road.
CATHERINE LAKE	6/29/2008	50	Strong winds blew a tree down on a car.
FRANKTOWN	6/29/2008	60	Strong winds blew Steeple off a church on Briar Neck Road.

Location	Date	MPH	Description
MORTON FORK	6/13/2009	50	Spotter reported trees blown down south of Belgrade.
HOLLY RIDGE	6/26/2009	50	Trees blown down on Morris Landing Road.
KELLUM	7/17/2009	50	A top of a pine tree reported blown off 3 miles northeast of Jacksonville near Kellum.
ERVINTOWN	8/11/2009	50	Several trees down in Richlands.
ERVINTOWN	5/16/2010	50	Tree blown down along Nine Mile Road near Richlands.
GREGORY FORKS	5/16/2010	50	Tree blown down along Gregory Fork Road west of Richlands.
MIDWAY PARK	6/13/2010	50	Tree blown down over Tallmans Circle in Midway Park.
ERVINTOWN	6/16/2010	63	Spotter measured a 72 mph wind gust in Richlands.
GREGORY FORKS	6/29/2010	50	Four large trees blown down on Goldie Lane.
HALF MOON	6/29/2010	50	Large tree limb blown down on Gum Branch Road.
NORTH TOPSAIL BEACH	7/18/2010	50	Power lines blown down by strong winds.
GREGORY FORKS	4/5/2011	50	Tree blown down on Gregory Fork Road near Richlands.
RICHLANDS	4/5/2011	50	Aluminum shed destroyed by strong winds on Hoffman Forest Road near Richlands.
GREAT NECK LNDG	6/17/2011	50	CoCoRaHS observer reported several trees down along Stella Road and Belgrade Road in Swansboro.
HUBERT	6/23/2011	50	Fire department reported trees down in Hubert.
WALTONS STORE	7/22/2011	50	Tree blown down on Foy Lockamy Road about 3 miles west of Jacksonville.
JCKSNVLL ELLIS ARPT	7/23/2011	50	Tree branch blown down onto a car near Albert J Ellis Airport.
Unincorporated Area	7/24/2011	59	ASOS at New River Air Station observed a 59 knot wind gust.
BELL FORK	7/24/2011	50	Public reported trees down on Pine Valley Road in Jacksonville.
HAWKSIDE	7/24/2011	50	Public reported tree limbs down across yard.
HAWKSIDE	7/24/2011	50	Public reported trees down near the intersection of Indian Drive and Gum Branch Road.
KELLUM	7/24/2011	50	Law enforcement reported trees down on road blocking New Bern highway in Jacksonville.
KELLUMTOWN	7/24/2011	50	Public reported large tree limbs down on Rocky Run Road near Piney Green.
PUMPKIN CENTER	7/24/2011	50	Law enforcement reported a tree down on a vehicle and powerlines across road on Piney Green Road.
GUM BRANCH	5/22/2012	50	Public reported trees down along Rhodestown Road.
Unincorporated Area	7/1/2012	54	New River Marine Corps Air Station (KNCA) observed a 62 mph thunderstorm wind gust.
Unincorporated Area	7/1/2012	50	National Weather Service storm survey found multiple pine trees snapped on Highway 111.
BROCKS	7/1/2012	50	National Weather Service storm survey found damage to a chicken coop on Comfort Road in Richlands.
ERVINTOWN	7/1/2012	50	National Weather Service storm survey found numerous large tree limbs scattered throughout Richlands.
HAWKSIDE	7/1/2012	50	National Weather Service storm survey found trees uprooted on Highway 17 North.
BELL FORK	7/24/2012	50	Public reported large tree limbs down in Jacksonville.
TAR LNDG	1/31/2013	50	Onslow county 911 reported trees down on powerlines near the intersection of Liberty Park Road and Richlands Highway northwest of Jacksonville.

Location	Date	MPH	Description
WILLIS LNDG	11/26/2013	55	Strong winds blew down several large trees along Bear Creek Road south of Hubert. One of the trees crushed a small shed.
JARMANTOWN	2/21/2014	50	Trees down on Burney Town Road.
BELL FORK	4/30/2014	52	Strong winds blew down a fence at a skate park in Jacksonville and damaged several skate ramps.
BELL FORK	4/30/2014	52	Trained spotter estimated wind gust of 60 mph on Gum Branch Road.
CATHERINE LAKE	6/5/2014	50	Strong winds blew down a tree near Catherine Lake.
GREGORY FORKS	6/5/2014	50	Strong winds blew down a tree along Catherine Lake Road to the west of Richlands.
SKY MANOR ARPT	6/5/2014	50	Strong winds damaged a metal roof near Haws Run.
BELL FORK	6/18/2015	50	Strong winds blew down a tree along Aragona Boulevard near Jacksonville.
BELL FORK	6/26/2015	50	Strong winds blew down a tree and power line just east of Jacksonville.
KELLUMTOWN	6/27/2015	50	Strong winds blew down a tree onto Jasper Road to the east of Jacksonville.
TAR LNDG	6/27/2015	50	Strong winds blew down a tree near the intersection of Burgaw Highway and Holly Shelter Road to the west of Jacksonville.
ERVINTOWN	7/21/2015	50	Strong winds blew down a tree along Highway 258 in Richlands. A fence was also damaged.
GUM BRANCH	7/21/2015	50	Strong winds blew down a tree blocking Gum Branch Road southeast of Richlands.
GUM BRANCH	7/21/2015	50	Strong winds blew down trees between Richlands and Jacksonville.
ERVINTOWN	5/3/2016	50	Strong winds blew a tree down on Highway 258 near Richlands.
KELLUMTOWN	7/8/2016	50	Strong winds blew down trees onto Highway 24 east of Jacksonville.
HAWKSIDE	7/19/2016	51	Wind gust of 51 knots measured by New River ASOS.
KELLUMTOWN	7/19/2016	50	Strong winds blew down a tree onto Piney Green Road east of Jacksonville.
BELL FORK	7/30/2016	50	Strong winds blew down trees onto Highway 17 near Jacksonville.
KELLUM	7/15/2017	52	Estimated 60 mile per hour wind gusts and nickel size hail were reported in Kellum on Highway 17.
BELGRADE	6/11/2018	50	Large limbs were blown down in various yards along Highway 17, south of the Onslow and Jones County line. The time was estimated based on radar.
PUMPKIN CENTER	6/24/2018	50	Trees were snapped and fell on power lines near the intersection of Piney Green Rd and Country Club Rd. The time was estimated based on radar.
JACKSONVILLE	4/19/2019	50	Shingles were damaged.
HAW	5/12/2019	50	A tree was blown down across Haws Run Rd.
HAW	5/12/2019	50	Numerous trees were blown down near Dawson Cabin Rd. Power lines were blown down as well.
SKY MANOR ARPT	5/12/2019	50	A tree was blown down across William Gurganus Rd.
BELL FORK	8/10/2019	50	Duke Energy reported over 2000 customers without power in the Jacksonville area. The assistant city manager confirmed the media outlets the outages were due to strong winds.
CAMP LEJEUNE	8/10/2019	50	Power lines were blown down. The time was estimated based on radar data.
KELLUMTOWN	8/10/2019	50	A large advertising sign was blown down on Piney Green Rd.
Pender County			
WATHA	2/14/2000	58	68 mph tstm gust measured by skywarn observer.
WATHA	3/16/2000	50	Trained spotter and ham radio operator measured a 58 mph wind gusts on his home weather equipment.
WATHA	4/8/2000	54	SKYWARN observer measured a 62-mph wind gust with home equipment.

Location	Date	MPH	Description
HAMPSTEAD	5/28/2000	56	Off duty National Weather Service employee estimated wind gusts to 65 mph during a thunderstorm at the Castle Bay golf course near Hampstead.
WILLARD	5/28/2000	60	Pender 911 reported trees down on Hwy 11 in Willard.
MAPLE HILL	8/16/2000	60	Pender county sheriff reported trees down across highway 50.
BURGAW	4/1/2001	65	General public reported a thunderstorm wind that destroyed a shed and blew it across a roadway.
SURF CITY	4/1/2001	69	Wind equipment at the Surf City drawbridge measured an 80-mph wind gust.
WATHA	4/1/2001	51	Trained spotter in Watha reported a measured 59 mph wind gust on his home wind equipment.
ROCKY PT	5/10/2002	61	Emergency manager reported a 6-inch diameter tree was uprooted. The wind was estimated at 70 mph.
BURGAW	6/14/2002	60	Trees down.
SURF CITY	7/5/2002	52	Surf City Bridge measured a 60-mph wind gust.
MAPLE HILL	7/10/2002	60	Public reported trees down.
BURGAW	8/24/2002	60	Sherriff's department reported trees down near Hwy 53.
HAMPSTEAD	11/12/2002	56	NWS employee (off duty) estimated a 65-mph wind gust at his residence. The strong winds blew a tree down onto a car.
SURF CITY	11/12/2002	59	Surf City bridge reported a measured 68 mph wind gust.
BURGAW	2/22/2003	55	Public reported large limbs down and a flag pole snapped.
SCOTTS HILL	5/31/2003	65	The fire department reported thunderstorm winds flipped a boat off its trailer and shingles were blown off roofs.
WILLARD	7/11/2003	60	Pender county electric company reported trees down in Willard. A large tree was also reported down in Watha.
HAMPSTEAD	9/22/2003	70	Strong winds blew eight trees down on Lee Drive, Factory Road, and Second Street.
SURF CITY	7/11/2004	65	The Pender county sheriff reported trees down across Hwy 50 between Holly Ridge and Surf City.
ROCKY PT	8/5/2004	55	A utility company reported trees down on power lines.
BURGAW	3/8/2005	52	A coop observer reported an estimated 60 mph.
SURF CITY	3/8/2005	63	A 72-mph measured gust was recorded at the Surf City bridge.
ATKINSON	4/17/2006	65	Several large trees were blown down at Wards Corner.
ATKINSON	7/15/2006	65	A large tree was down on on SR 53, with numerous trees and limbs down across town. A church sign and power lines were also blown down.
ASHTON	3/15/2008	83	Numerous pine trees were blown down or snapped along a path about 100 yards wide and 300 yards long. Five mobile homes were damaged by downed trees in the Interstate Mobile Home Park and adjacent Cedar Grove Mobile Home Park. Two of these homes were knocked off of their foundations and sustained major damage. A National Weather Service Storm Survey concluded the damage was the result of straight-line winds between 90 and 95 mph. Pender County officials estimated all storm related damage totaled $2 million dollars.
ATKINSON	6/29/2008	50	A large tree was reportedly snapped by the wind.
WATHA	6/29/2008	50	Trees were reported down across Shiloh Road. The report was relayed by the fire department.
PINEY WOOD	5/4/2009	52	Large tree branches were down. The branches were up to six inches in diameter. A chainsaw was required to remove them.
WILLARD	7/28/2009	52	A large tree was reported blocking Old Mill Road.
HIGHSMITH	12/2/2009	52	A spotter estimated a wind gust to 60 to 70 mph near the intersection of Stone House Road and State Road 1402.
MONTAGUE	6/16/2010	50	Several large tree limbs were reported down. The tree limbs had diameters of 4 to 6 inches. The public estimated a wind gust to 60 mph. Time was estimated based on radar data.

Location	Date	MPH	Description
PINEY WOOD	6/25/2010	50	One large tree was reported down along Tuckahoe Road. Time was estimated based on radar data.
BURGAW	8/12/2010	50	A large tree was reported down on North Wright Street. The time of occurrence was estimated based on radar data.
HAMPSTEAD	4/5/2011	56	A large tree was reportedly down near the intersection of Center Drive and Thornton Drive. The time was estimated based on radar data.
HIGHSMITH	4/5/2011	56	Trees were reportedly down near the intersection of Highsmith Road and Scott Road.
LONG CREEK	6/23/2011	50	Large limbs were reported down.
SURF CITY	6/29/2011	55	A weather station at the Surf City Tourism and Information Center on Shore Drive measured a wind gust of 63 mph.
STAG PARK	8/12/2011	61	A National Weather Service Storm Survey Team concluded a microburst with winds to 70 mph downed numerous trees. The tops of some of the trees were twisted. Power lines were also reported down. The damage occurred along Stag Park Road and extended for a little over one mile.
SURF CITY	3/25/2012	50	Shingles were reportedly blown off a cafe roof and 150 feet of canopy was ripped by the winds. The time was estimated based on radar data.
NEW TOPSAIL BEACH	12/26/2012	51	A thunderstorm wind gust to 59 mph was measured.
BELLS XRDS	6/13/2013	52	A large tree was reported across Scott Road near the Long Creek Grady Fire Department. The time was estimated based on radar data.
PENDERLEA	6/13/2013	52	A tree was reported down on a power line at the intersection of Highway 11 and Red Tip Lane. The time was estimated based on radar data.
BURGAW	11/27/2013	56	A small metal storage building was picked up and wrapped around a utility pole near Stag Park Road and Jewell Lane.
BURGAW	11/27/2013	50	A small utility trailer was rolled over in a yard on Stag Park Road. Numerous limbs were reported down.
BURGAW	11/27/2013	56	The covered front porch was blown off a home on Stag Park Road and into the rear of the property. A third of the metal roof peeled off the home. Two large trees were also snapped about 30 feet off the ground.
BURGAW	11/27/2013	56	The covered front porch was blown off a home on Stag Park Road. A large tree was snapped approximately 10 feet above the ground.
WHITE STOCKING	11/27/2013	50	A large pine tree was blown down across White Stocking Road. The tree was removed by the Department of Transportation.
BURGAW	2/21/2014	50	Five trees were reported down near the intersection of Penderlea Highway and Basden Road. The time was estimated based on radar data.
CURRIE	2/21/2014	52	An open-air canopy roof was reportedly ripped off a building at Blueberry Road and Highway 210. The time was estimated based on radar data.
BURGAW	7/15/2014	52	Media relayed a viewer report of a tree down on a house on Phedora Spur. There were no details as to any structural damage. The time was estimated based on radar data.
MALPASS CORNER	8/18/2014	52	Two trees were reported down near and along Highway 421 just south of Malpass Corner. Hail of unknown size was also reported.
NEW TOPSAIL BEACH	8/18/2014	52	A 60-mph wind gust was measured at Topsail Beach marker 3.
NEW TOPSAIL BEACH	8/18/2014	59	A wind gust to 68 mph was measured at the Topsail Beach Fire Department.
PENDERLEA	8/22/2014	50	Several trees and tree limbs were knocked down and one large tree was uprooted along Shiloh Road and Lake Road. Some trees fell onto power lines. A large field of corn was also blown down.
STAG PARK	6/18/2015	52	A tree was reportedly snapped on Stag Park Road near Jordans Church.

Location	Date	MPH	Description
HAMPSTEAD	7/13/2015	50	Two pine trees were reportedly down on roadway near 3000 block of Highway 210. The time was estimated based on radar data.
ROCKY PT	7/23/2015	52	A large tree was reported down across the westbound lane of Interstate 40 near exit 408. Traffic was reportedly backed up. The time was estimated based on radar data.
PENDERLEA	8/6/2015	50	A tree was reported down on Indian Hill Road, approximately 1 mile from Highway 421.
SCOTTS HILL	7/14/2016	50	One tree and tree limbs were reported down in Plantation Landing.
BELLS XRDS	7/31/2016	51	A large tree was reportedly down on Highway 133 near Forest Lane. The time was estimated based on radar data.
CURRIE	7/31/2016	56	A tree was reported down on a house on Blueberry Road and caused unspecified structural damage. Other trees were also reported down along Blueberry Road. The report was relayed through the media. The time was estimated by radar data.
MONTAGUE	7/31/2016	56	Several trees and tree limbs along a short stretch of Richard Switch Road were reportedly down. The time was estimated based on radar data.
MALPASS CORNER	5/5/2017	52	A large tree was reported down along Highway 53 near Pender High School.
PENDERLEA	5/29/2017	52	Two houses reportedly sustained partial roof damage as did a couple out-houses. Trees were reported down. The damage occurred in the 5000 block of Englishtown Rd. The Pender County Emergency Manager determined the damage was the result of straight-line thunderstorm winds. The time was estimated based on radar data.
WOODSIDE	7/6/2017	50	Trees were reportedly down, a flag pole was snapped and outdoor furniture was blown around on one property on Pinnacle Pkwy.
LONG CREEK	7/8/2017	54	Half the roof of a barn was reportedly blown off on Montague Rd. Several trees on the property were reported split or down. One tree was uprooted. Small hail was also reported. Radar data was used to confirm the time of the event.
MALPASS CORNER	7/8/2017	50	A couple of trees were reported down on Herrings Chapel Rd.
BURGAW	5/12/2019	56	The public reported trees down with damage to power lines in Burgaw.
BURGAW	5/12/2019	56	There were multiple metal roofs blown off which led to power line damage. Large industrial sized drain pipes were also blown across Wallace Street in Burgaw.
ST HELENA	8/10/2019	56	Trees were blown down across Newroad Ave, north of Rocky Point.
STAG PARK	8/10/2019	56	Power lines were blown down on Stag Park Rd.

TABLE H.11: TORNADO EVENTS (2000-2019)

Location	Date	Scale	Description
Brunswick County			
SHALLOTTE	9/11/2001	F0	A waterspout moved ashore just east of the Ocean Isle Beach fishing pier. According to eyewitness accounts from a police detective, the tornado moved northwest through undeveloped property across First and Third streets, then into the marsh on the north side of the island. No damage was reported.
SHALLOTTE	7/24/2002	F0	A waterspout formed in the Shallotte River and briefly moved over land before dissipating. The F0 tornado crossed Gray Bridge Road. There was no damage reported.
LONG BEACH	9/10/2004	F0	Ham radio operator relayed a report of a tornado just southwest of St James Plantation. No damage was reported.
SOUTHPORT	9/10/2004	F0	Deputy sheriff reported two nearly stationary tornadoes. No damage was noted.
REGAN	4/6/2009	EF1	A National Weather Service Storm Survey concluded that an EF-1 tornado with winds up to 105 mph occurred near Longwood, North Carolina. The tornado initially touched down near Etheridge Road NW and State Route 1300. The tornado produced EF-0 damage in this location with two homes suffering minor damage. A small hog pen was

			destroyed near the two homes and six trees were snapped. Spotty damage was observed to trees as the tornado moved east-northeast across State Route 1300. The tornado peaked at EF-1 with significant damage to over forty trees north of the intersection of Ward Road NW and Etheridge Road NW. It turned to the northeast causing spotty EF-0 damage at the north end of Freedom Star Road. It then crossed Highway 904 and Butler Pond before reaching Butler Circle NW where six trees and a shed were damaged. The tornado lifted before reaching Russtown Road NW. There were no injuries or fatalities.
EAST ARCADIA	6/7/2013	EF0	A National Weather Service Storm Survey Team concluded an EF0 tornado with winds to 70 mph caused damage just to the west of Varnamtown. A tornado touched down just to the south of Varnamtown Road SW near the intersection with Stone Chimney Road SW. The damage was just to the east of the church located there. The tornado crossed Varnamtown Road SW from south to north and caused most of the damage on the north side of the road. Numerous trees were snapped. Large limbs were also down. Some of these limbs fell onto a large storage building causing damage. The tornado quickly lifted behind the homes on the north side of the road.
HOLDEN BEACH	9/22/2013	EF0	A brief tornado, with winds up to 65 mph, touched down near Lafayette Street north of Holden Beach Road SW. The tornado uprooted a tree and knocked down large limbs before crossing McLamb Avenue SW. Snapped trees fell onto a home on the east side of the road. On the west side of the road, a screened in porch was lifted from its foundation and two pump houses were thrown into a home. The tornado proceeded across Lakesedge Drive SW where it knocked down a couple trees and lifted over a pond on the north side of the road.
MALMO	6/27/2015	EF0	A survey was conducted by the National Weather Service and found no apparent damage. However, a video taken by someone in the area at the time did confirm the brief touchdown. The tornado touched down just off of U.S. Highway 74 near Sandy Creek. The tornado caused minor roof damage and moved a farm tractor a few feet. A large tree fell and broke a fence. The tornado was rated EF-0 with winds up to 70 mph. The path length was 50 yards.
REGAN	2/15/2017	EF1	A survey conducted by the National Weather Service concluded an EF-1 tornado first touched down along a hunting trail south of Pireway Rd NW, causing tree damage west of Longwood, North Carolina. The tornado tracked east across inaccessible portions of forest before emerging near the intersection of Etheridge Rd and Ash-Little River Rd NW where it snapped trees and caused significant roof damage to a home. The tornado snapped dozens of pine trees on the north side of Etheridge Rd. The tornado crossed Etheridge Rd near Gwynn Rd NW and toppled dozens of pine trees and a poorly constructed barn between Gwynn Rd NW and Ward Rd NW. As the tornado continued to move east, it caused damage to vehicles near Ward Rd NW and Quaker Dr NW along with minor roof damage to the first home on Quaker Dr NW. The tornado then lifted south of Etheridge Rd between Ward Rd NW and Cephus Trail NW. The tornado had estimated maximum winds of 90 mph and was on the ground for about 5 minutes.
SUPPLY	10/23/2017	EF0	A survey team from the National Weather Service discovered tree damage in a very rural portion of Brunswick County. The damage observed was along Makatoka Rd where a few large trees around a foot in diameter were snapped and a few larger limbs were knocked out of tree tops. The damage was determined to be due to an EF-0 tornado with winds up to 65 mph. The tornado had a path length of just over a third of a mile and a maximum path width of 50 yards. The tornado was on the ground for less than 2 minutes.
WINNABOW	9/16/2018	EF0	A tornado touched down briefly on the north side of Governors Road and moved northwest for about a tenth of a mile. About a dozen small pine trees were broken off.

SEASIDE	9/5/2019	EF2	Video shared on social media showed the tornado moving onshore near Tubbs Inlet. The tornado moved northwest causing moderate tree damage and minor roof damage as it crossed Sunset Blvd N near |Sunset Beach Town Hall. Spotty tree and roof damage continued as |the tornado crossed Sea Trail Golf Resort and moved into a large |wooded area north of Old Georgetown Road SW (Hwy 179). To this |point along the path, damage was consistent with wind speeds in |the 80-90 mph range (EF-0/EF-1). ||The tornado emerged near Bennett Trail SW at the intersection of |Thomasboro Road, and caused major roof damage to a few homes and a horse barn. Large sections of roofs were blown off, and numerous |large trees were snapped as the tornado approached The Farms at |Brunswick community. In this area, the tornado strengthened to |EF-2 with a width of approximately 200 yards. Damage in The Farms |was extensive. Several dozen homes received minor to major damage |along Carolina Farms Blvd, Slippery Rock Way, Fence Post Lane and |Castle Run Lane. The tornado reached maximum intensity as it |crossed Slippery Rock Way near Fence Post Lane, where large |sections of roofs were blown off. There were several instances of |lumber piercing both exterior and interior walls of houses. The |only known injury, a broken arm, was sustained in this area. ||The tornado exited The Farms at Brunswick and crossed Highway 17|just south of the intersection of Hickman Road (Hwy 57). Two open air carports and a metal garage were destroyed on the north side of Highway 17. It crossed the holes 14-16 of Crow Creek Golf |Club, snapping numerous large pine trees and causing minor roof |damage to homes along Honey Tree Lane. The tornado crossed |Hickman Road behind Beulah Baptist Church, traversed the north |end of Green Pastures Lane, and snapped numerous large hardwood |and pine trees throughout private game land. It caused minor |damage to a farmhouse and destroyed a chicken coop before crossing Ash Little River Road NW. Numerous trees were snapped and uprooted on the west side of Ash Little River Road NW as the tornado moved into swampland near the Waccamaw River. Damage along and north of Hickman Road was consistent with maximum winds of 90-100 mph winds (EF-1).
SOUTHPORT	9/5/2019	EF0	The tornado touched down briefly on the Military Ocean Terminal Sunny Point complex. Approximately one dozen pine trees up to 12 inches in diameter were snapped on either side of MOTSP Access Road.
SUPPLY	9/5/2019	EF1	Initial damage was observed from the end of Middle River Road NE, where |about a dozen trees up to 14 inches in diameter were snapped, along with a few smaller hardwoods. From this point, the tornado tracked over rural |and inaccessible swamp land towards Highway 211. On the east side of 211, approximately 50 large pine trees were snapped in an area about 50 yards wide. Several trees fell across Highway 211, and a few additional smaller trees were snapped on the west side. Little significant damage was |observed west of 211.
New Hanover County			
KIRKLAND	5/11/2008	EF0	A tornado moved across a small marsh island, just north of Bridge Road, before moving offshore as a waterspout. The public reported seeing the rotation extend to the surface as it passed across the uninhabited island. There was reportedly no discernible damage. The tornado was rated an EF0. The path length was estimated at 0.2 miles and the maximum path width was estimated at 10 yards.
CAROLINA BEACH	8/18/2011	EF0	A National Weather Service Storm Survey Team concluded a waterspout came ashore as an EF-0 tornado with winds to 65 mph. The tornado had a path length of one-third of a mile and a maximum path width of 20 yards. The waterspout was moving to the southwest, parallel to the northern portions of Carolina Beach. It eventually moved onto the coast just southeast of the Marriott Hotel at the north end of Carolina Beach Avenue South. The tornado crossed over the dunes and destroyed a wooden dune bridge structure. The tornado crossed near the intersection of Woody Hewett Avenue and Atlanta Avenue causing minor damage to a light pole at a car wash. The tornado

			tossed patio furniture and umbrellas into the air prior to crossing South Lake Park Boulevard. Video showed that the tornado moved across Carolina Beach Lake and then quickly lifted near the lake's southern shoreline.
WRIGHTSBORO	12/24/2014	EF1	A National Weather Service Storm Survey Team concluded an EF-1 tornado with winds estimated to 105 mph briefly touched down in Castle Hayne, North Carolina. The tornado destroyed a large shed, damaged a house, moved a box car type storage structure and damaged some trees. One person was injured due to flying glass. The damage was mainly confined to one property on Gladiolus Road. The tornado lifted as it neared I-140 and there was no evidence of any further touchdowns. The path length was 360 yards and the maximum path width was 25 yards.
BAYMEADE	5/5/2016	EF1	A survey conducted by the National Weather Service concluded at EF-1 tornado with winds up to 95 mph injured one and caused extensive damage, intermittently touching down as it moved through several communities. The tornado initially touched down in the community of Landfall near Arboretum Drive and Fair Lakes Drive. Extensive damage was done to about 30 stately trees along Fair Lakes Drive, Marshland Drive, Inverary Way and Dundee Lakes Place. A few trees up to two feet in diameter were snapped off and numerous trees were uprooted. Several large limbs were blown out of trees and caused damage to one home on Dundee Lakes Place where windows were also blown out. A vehicle weighing more than 4000 pounds with two passengers inside was traveling on Fair Lakes Drive. The tornado lifted the car from the street and deposited it at an angle on the grass a few feet away. The vehicle did sustain damage, but the occupants were not injured. The tornado crossed Howe Creek and produced significant damage to approximately two dozen large trees in the Timber Creek neighborhood. Falling limbs resulted in one injury on Tree Lake Court. The tops of several trees were snapped off and many were uprooted. Minor shingle and fascia damage were noted to one home as well. The tornado then crossed Middle Sound Loop Road and caused extensive damage to numerous trees and several homes on Wellington Drive and East Bedford Road. Dozens of trees up to two feet in diameter were uprooted or snapped. A large snapped pine tree fell through the roof of a home on East Bedford Road. The funnel lifted for the last time near the intersection of Middle Sound Loop Road and Buckeye Drive. The tornado had a path length of 1.8 miles and a maximum path width of 75 yards.
BAYMEADE	9/15/2018	EF0	A brief tornado touched down on the south side of Biscayne Drive at Pages Creek. The tornado moved NW for about 2 minutes and snapped a couple dozen trees up to 14 in diameter, uprooted several large trees, and caused significant roof damage to a home on Biscayne Drive. The tornado lifted near the intersection of Bayshore Drive and Biscayne Drive. It touched down again briefly on the west side |of Market Street (US-17) near the intersection of Yvonne Road and |Jacqueline Drive. In a wooded area near the Cedarbrook Arabians |horse training facility, several pine trees up to 14 in diameter |were snapped or uprooted on both sides of Yvonne Drive.
EAST WILMINGTON	9/15/2018	EF1	A tornado touched down near the intersection of Floral Parkway and |Park Avenue, causing minor tree damage as it moved quickly northwest. Damage became more severe as it passed east and north of Empie Park, where a few pine trees up to 18 inches in diameter were snapped, and numerous large limbs broken. A nearly continuous path of tree damage |was observed as the tornado continued northwest across the Forest Hills community and 23rd Street between Market Street and Princess Place Drive. This area also received significant tree damage during |the landfall of Hurricane Florence, however the path of the tornado was discernible by observing damage limited primarily to broken and |twisted limbs amongst tree tops. The heavy damage to large oak trees |in Forest Hills and on 23rd Street was apparently a result of the hurricane, and not the tornado. The tornado moved northwest, crossing |Princess Place Drive and snapping several trees up to 10 inches in diameter, along with

			numerous limbs along 21st Street and the intersection with Klein Road. The tornado broke large limbs from a few trees along Wynnwood Street in the Love Grove community before lifting.
KIRKLAND	9/15/2018	EF0	A brief tornado touched down on the north side of Porters Neck Road between Porters Neck Road and Tibbys Drive. The tornado moved NW for less than 2 minutes and snapped a couple dozen trees up to 16 in diameter and uprooted a few large trees.
MURRAYSVILLE	9/15/2018	EF1	An EF-1 tornado impacted the Brittany Lakes area of Murrayville near |Wilmington NC. Maximum winds were estimated at 95 mph. The tornado initially formed near Dove Field Ct and Brittany Lakes Rd. It moved into a wooded area causing dozens of trees to snap or become uprooted. Several of the trees were down onto a few homes on the north side of Brittany Lakes Rd. The tornado moved toward the west-northwest, passing just south of the west end of Quail Woods Rd. The tornado caused additional tree damage just north of Creek Ridge Rd and lifted near Brittany Rd.
MYRTLE GROVE	9/15/2018	EF1	A tornado touched down in the Elliot Place neighborhood on River Vista Drive, snapping approximately 15-20 hardwood trees up to 18 in diameter. The tornado moved northwest and across the Cape Fear River. It caused minor tree damage, breaking out a few limbs as it lifted near NC 133 in the vicinity of Pleasant Oaks Plantation Road.
SOUTH WILMINGTON	9/16/2018	EF0	An EF-0 tornado, with winds estimated at 75 mph touched down along Split Rail Dr. Several large limps were torn from the tops of about a dozen pine trees, some falling onto a pickup truck.
WRIGHTSBORO	9/16/2018	EF0	A tornado touched down briefly along Blue Clay Road north of I-140 and west of North College Road. Several hardwood trees up to ten inches in diameter were snapped off approximately 15 feet off the ground.
MASONBORO	12/20/2018	EF0	A tornado formed just west of Sutton Dr. along Waltmoor Rd in the Oxford place area of Wilmington. The tornado moved northwest between Waltmoor Rd |and Archer Dr. The tornado lifted just prior to reaching Pinecliff Dr. It primarily caused damage to numerous trees and knocked down several fences. However, the tornado uprooted trees onto at least three homes along Waltmoor Rd and onto a minivan on Archer Dr. In addition, the tornado flipped over a large wooden shed and knocked a small boat onto its side.
WILMINGTON	9/5/2019	EF0	A short-lived tornado impacted the Brookfield Community near |Gordon Rd in the Wilmington area. The tornado formed just south of Stones Edge Loop causing some damage to trees. The tornado moved |across Northbrook Rd and knocked large limbs down. It also caused |the walls to buckle at a home along Northbrook Rd., destroyed a |nearby shed, and knocked several large limbs out of a large tree. |The tornado moved northwest causing damage to an old shed on the |south side of Briercrest Dr. The tornado then crossed Briercrest |Dr. causing minor damage to a home and knocking large limbs out of trees. The tornado lifted in the vicinity of Gordon Rd. east of |North Kerr Ave.
EAST WILMINGTON	9/5/2019	EF0	A weak tornado with winds generally 55 to 65 mph caused mainly minor tree damage from near Wrightsville Ave around Eisenhower Rd into the Burnt Mill Creek area. The weak tornado quickly moved |toward the northwest and completely lifted near the west end of |Klein Rd.
KIRKLAND	9/5/2019	EF1	A waterspout moved ashore over the northern end of Figure Eight Island, causing EF0 damage to a couple beachfront homes and trees. The tornado track was evident across the marsh towards the Intracoastal Waterway, where it affected Bald Eagle Ln. At the Bald Eagle Ln area there was one injury, numerous trees snapped and uprooted, along with mostly minor home damage. The tornado moved northwest towards Fazio Dr where it created its widest damage, including some roof damage and large trees snapped near the Porter's Neck golf course. The tornado continued to move northwest

			to Futch Creek Rd and Plantation Landing Dr where it lifted after producing EF0 damage, mainly to trees.
MYRTLE GROVE	9/5/2019	EF0	A tornado initially impacted the SE Harbor Dr area with large limbs down. The tornado moved west-northwest breaking numerous large limbs. It crossed Myrtle Grove Rd breaking large limbs and uprooting a few trees up to 3 feet diameter. Shingles were also blown off a shed in this area. The tornado lifted on the north side of Grove Point Rd.
			Onslow County
RICHLANDS	3/16/2000	F0	An F0 tornado briefly touched down near the town of Richlands destroying one mobile home.
CATHERINE LAKE	5/21/2000	F0	A tornado touched down in western Onslow county near Ellis Airport and tracked northeast through the woods for 1 mile. The tornado was tracked by a trained spotter until it dissipated.
JACKSONVILLE	2/22/2003	F0	Public report of brief tornado touchdown with minor damage reported at Chico's Used Tire Store on highway 24.
HALF MOON	7/2/2003	F0	Public report of brief tornado touchdown in an open field.
JACKSONVILLE	7/2/2003	F1	Onslow County Emergency Management reported tornado damage to ten homes in the Angola area near the intersection of Highway 53 and Gurganus Road in southwest Onslow county.
RICHLANDS	7/2/2003	F0	Media reported a brief tornado touch down on Highway 258.
SWANSBORO	6/22/2004	F0	Weak tornado moved across a neighborhood in Swansboro taking some siding off a house.
RICHLANDS	8/13/2004	F0	Emergency Manager reported a brief tornado touchdown damaging a home in Richlands.
JACKSONVILLE	8/14/2004	F0	Emergency Manager reported minor structural damage at the Beachman Apartments south of Highway 17.
JACKSONVILLE	4/17/2006	F0	Tornado briefly touched down and moved southeast across New River affecting boaters.
JACKSONVILLE	7/23/2006	F0	Brief tornado over New River.
SNEADS FERRY	8/31/2006	F0	Spotter reported tornado.
BELGRADE	5/11/2008	EF2	Tornado touched down near Belgrade and moved east into southern Jones county about 1 mile southeast of Belgrade. The tornado had a path length of around 5 miles and was rated as an EF2. Several homes received moderate to severe damage with 6 minor injuries reported. Several outbuildings were destroyed and numerous trees were sheared off.
MORTON FORK	5/11/2008	EF0	Brief tornado touchdown reported by several people south of Belgrade. No damage was reported and was rated as an EF0.
ONSLOW BEACH	9/25/2008	EF0	Public reported brief tornado touch down near Onslow Beach. No damage was reported.
MIDWAY PARK	5/7/2009	EF0	Brief tornado touchdown near Camp Lejeune main gate. No damage reported.
MIDWAY PARK	4/16/2011	EF3	Tornado spun up near Tarawa Terrace and quickly increased to EF2 intensity with winds to 125 mph and a damage width of 100 yards. Many residences were damaged severely. The tornado continued to track northeast and crossed Highway 24 and the Holiday City Subdivision at EF2 intensity with many homes severely damaged. The tornado widened to about 450 yards as it crossed the Colonial Heights Subdivision with winds around 100 mph. The tornado narrowed to about 100 yards and increased to EF3 intensity with winds to 145 mph as it crossed Piney Green Road and impacted the Montclair Subdivision. Severe damage to many homes with some totally destroyed. Several vehicles were picked up and tossed. The tornado then appeared to weaken and lift as it moved northeast of Piney Green. Total damage was estimated at 9.4 million

			dollars. There were 30 injuries directly related to the tornado, 3 critical. No fatalities occurred.
CAMP LEJEUNE	6/10/2013	EF1	A National Weather Service storm survey found evidence of an EF1 tornado with winds estimated at 80 to 90 mph touched down north of Jacksonville. The tornado touched down near the intersection on Springwood Drive and Terry Lee Lanier Drive. The tornado produced sporadic damage for about 1/2 mile before lifting. Minor structural damage to a few homes was observed with several trees blown down or snapped. There were no injuries.
WILLIS LNDG	9/15/2018	EF1	A tornado touched down in Camp Lejeune. Maximum winds were estimated at around 90 mph. The damage path started along Highway 172, south of Lyman Road. Most of the damage was confined to about 10 to 15 snapped pine trees with a few uprooted pine trees. Most of this damage was oriented toward the southwest or west. However, a small building that was open toward the west, had damage inside the building pointed toward the southeast or in the opposite direction of the storm motion. We were not able to examine the total path, but more damage was found to the northwest of the initial point crossing Lyman Road. The time was based on radar data.
			Pender County
ROCKY PT	3/16/2000	F0	Initial damage began 2 miles north of Rocky Pt., off Ashton Rd, damaging a car and a fence. Tornado proceeded east to Kellyville Road, moderately damaging the roof and carport of a house. During a damage assessment, an NWS employee notice that part of the house was lifted off its foundation.
CURRIE	4/25/2000	F0	Roof of a hangar at a small airstrip was blown approx. 350 feet. Some damage was reported to an airplane inside the hangar.
BURGAW	4/28/2000	F0	A small tornado tracked about a mile across western and northern Burgaw, touching down just south of the prison at the State Highway barn, at Old Savannah Road, and at Ed Cowan Road, snapping trees and damaging 4 buildings on two residential properties.
MAPLE HILL	4/1/2001	F0	NWS surveyed damage to a turkey farm in Maple Hill. One building sustained significant damage, with debris consisting of broken timbers, sheets of tin, and various feeding equipment, spread over an area that was approximately 100 yards wide and a quarter mile long.
WATHA	5/27/2003	F0	A NWS storm survey determined an F0 tornado touched down 4 miles west of the town of Watha. It snapped 12-15 pine trees up to 18 inches in diameter. One tree hit the side of a house, with minor damage. The tornado complete destroyed a shed in this area. Moving southeast, the tornado snapped six small pine trees, and a wood fence was blown over. More damaged was observed east-southeast of the previous damage, where a barn roof was blown off, and debris was strewn east approximately 100 yards. The minimal tornado then turned on a more east-northeast path, with damage observed east of Watha. Two large trees were uprooted, and a brick chimney was toppled. Eyewitness accounts reported strong rotation in the clouds, just off the ground. The damage path ended 3.5 miles east of Watha, where a couple dozen pine and hardwood trees were snapped, 10-40 feet above the ground.
ROCKY PT	8/13/2004	F2	The remnants of Tropical Storm Bonnie produced a tornado that touched down just south of Rocky Point and moved northeast, causing F0-F2 damage. Damage (F0) was first observed near West Strawberry Lane, with roof damage to a couple of structures. The tornado crossed I-40, just southeast of Rocky Point. It then tracked across Martin Marietta Access Road, causing f0-f1 tree damage. The tornado intensified to f1-f2 as it moved into a small community along Hwy 210. Significant damage occurred on Clayton Lane, Nixon Avenue, and Pickett Road. The tornado reached peak intensity as it moved across Cart Wheel Road, where several homes were completely leveled. It continued to track northeast, with F1 tree damage. The tornado crossed the Northeast Cape Fear River and finally dissipated near Shaw Highway, approximately one mile

			north of Hwy 210. The following is a summary of damage from Pender County Emergency Management: 17 homes destroyed, 25 other homes suffered major damage, 34 other homes suffered minor damage, 2 businesses suffered major damage, 1 business suffered minor damage
POINT CASWELL	11/16/2006	F1	Tornado tracked through trees in western Pender County before hitting barns and vehicles along NC Highway 210. A large tractor trailer was overturned and a large shed was destroyed. There was minor roof damage to a home and a large tree was heavily damaged.
HAMPSTEAD	3/15/2008	EF1	A National Weather Service Storm Survey concluded a tornado first touched down about 100 yards southwest of State Route 210. The tornado traveled northeast, across the intersection of Pansy Lane and Peanut Road where several businesses and homes were damaged. The tornado crossed near the intersection of Loblolly Trail and Pinestraw Drive where several homes were damaged and numerous trees were blown down. The tornado then lifted and skipped for another half mile, crossing Old Casteen Road, and then dissipating near Ravinswoods Road. Along its length, the tornado frequently lifted to tree top level and caused tops of trees to snap. There were 15 homes that received minor damage and 3 that sustained moderate damage. There were 10 businesses that sustained minor damage, and 3 that experienced moderate damage. Damage to one business was described as major. There were 5 mobile homes with minor damage and 2 with moderate damage. The maximum path width was 100 yards. The path length was almost 2 miles. The tornado was rated EF1, with winds up to 110 mph. However, for most of its length, the tornado was rated an EF0. Pender County officials estimated total storm damage was $2 million dollars.
SURF CITY	8/27/2008	EF0	A waterspout briefly came ashore as a tornado before dissipating. The tornado crossed the beach and tossed around some pool furniture at the Surf Condos. There was no significant damage reported.
ATKINSON	4/28/2011	EF1	A National Weather Service Storm Survey Team concluded a tornado touched down two miles southwest of Atkinson, in Pender County North Carolina. The tornado was rated up to an EF1 with maximum winds estimated to 110 mph. The path length was just shy of a third of a mile and the maximum path width was 60 yards. The tornado first touched down as an EF0 near the edge of a field west of Slocum Trail Road with strong inflow noted on its southern flank causing extreme damage to two grain silos and a barn. The damaged silos and barn were blown across the road. The tornado strengthened to an EF1 along a stand of trees west of Slocum Road before weakening as it moved north-northeast across the road and lifting. A few dozen trees were snapped and uprooted along the path of the tornado.
ATKINSON	4/28/2011	EF0	A National Weather Service Storm Survey Team concluded an EF0 tornado touched down near Atkinson in Pender County, North Carolina. The maximum wind speed was estimated to 85 mph. The path length was near six and a half miles and the maximum path width was 50 yards. The tornado first touched down on the west side of Highway 11, south of Atkinson. The tornado damaged two dozen trees and caused minor damage to three homes. The tornado then moved northeast, crossing Highway 11, just south of Atkinson and then across Rooks Road, damaging more trees. The tornado then crossed Highway 53 in a narrow path, east of Atkinson, snapping a few dozen trees. Finally, as the tornado crossed Point Caswell Road, it downed dozens of trees before lifting.
PINEY WOOD	4/28/2011	EF1	A National Weather Service Storm Survey Team concluded a tornado touched down 5 miles west-southwest of Watha in Pender County, North Carolina. The maximum wind speed was estimated to 90 mph. The path length was just over three miles and the maximum path width was 60 yards. The tornado first touched down near the fish hatchery on the south side of Shiloh Road. As the tornado moved across Shiloh Road, it uprooted and snapped several dozen trees. Several large trees fell across houses

			causing roof damage. Other houses suffered minor roof, soffit and siding damage. The damage was rated EF1 in this area with winds to 90 mph. The tornado continued to the northeast and weakened, but did damage the roof of another house on Shiloh Road. The tornado continued to the northeast, crossing Penderlea Highway where it did substantial damage to a large storage building, uprooted several trees and ripped the top off a grain silo. The tornado finally lifted northeast of Penderlea Highway.
WILLARD	4/28/2011	EF0	A National Weather Service Storm Survey Team concluded an EF0 tornado touched down near Willard in northern Pender County, North Carolina. The maximum wind speed was estimated to 80 mph. The path length was near a quarter of a mile and the maximum path width was 30 yards. The tornado touched down near a turkey farm near Meadow Beauty Road. The tornado slammed into one of the turkey houses causing significant damage and killing several turkeys. The tornado lifted northeast of the turkey farm and prior to reaching a stand of trees.
SURF CITY	7/19/2017	EF0	A storm survey conducted by the National Weather Service confirmed a waterspout moved onshore with tornadic winds up to 70 mph that resulted in minor damage. The EF-0 tornado tossed patio furniture and caused minor damage to wooden patio fencing at one residence on S Shore Dr. The tornado quickly moved across S Shore Dr. and caused minor roof damage to a home at the intersection of Seahorse Ave. and S Shore Dr. The tornado caused more roof damage to a home on the north side of Seahorse Ave. as well as a town house before lifting. There was considerable video evidence of the waterspout and tornado. The path length was less than two tenths of a mile.
ATKINSON	9/15/2018	EF1	A tornado touched down on the east side of Beattys Bridge Road about 0.3 mile southeast of the intersection with Slocum Trail, breaking numerous small limbs out of a few trees in the front yard of a residence. Additionally, the roof of a camper, which was parked in the yard, was blown off. The tornado lifted and touched down again as it crossed over a cemetery at the intersection of Slocum Trail and Beattys Bridge Road. It passed directly over a mobile home which was occupied at the time. The tie down straps broke, and the mobile home briefly lifted a few inches off the ground as the tornado passed over. A shed on the property was destroyed and debris recovered nearly one-quarter mile away. In the woods immediately west of the mobile home, a few dozen hardwood trees up to 16 in diameter were snapped.
HAMPSTEAD	9/15/2018	EF0	Tornado damage was observed in a half mile path starting in the woods southeast of Great Oak Drive in the Deerfield community in Hampstead NC. The EF-0 tornado moved across Great Oak Drive to East Creek View Drive before it lifted over a tidal creek located |northwest of East Creek View Drive. The tornado mainly snapped |trees as it moved quickly toward the northwest. It flipped a boat onto a car along East Creek View Drive and damaged a detached garage. Before the tornado lifted it flipped a boat dock on the tidal creek.
SURF CITY	8/5/2019	EF0	A tornado briefly touched down in the Blackbeard Campground. Two RVs sustained minor damage and two property owners sustained minor injuries.
SCOTTS HILL	8/7/2019	EF0	A storm survey determined an EF-0, with winds of 65 mph touched down just east of Hwy 17 in a wooded area, with minor tree damage.
CLARKS LNDG	9/5/2019	EF1	A tornado formed near Forest Lane, where several large tree branches were broken. The tornado continued off to the northwest, where EF0 damage was also seen at Clarks Landing Loop Rd due to several snapped trees near a field. Low-end EF1 damage was then observed on Long Creek Loop Rd where softwood trees were snapped. The tornado continued off to the northwest where damage was limited to broken tree limbs, before lifting near Herrings Chapel Rd and Mulberry Ln.
SCOTTS HILL	9/5/2019	EF0	A tornado formed near Scott's Hill Animal Hospital and moved west-northwest across Highway 17. The tornado caused some structural damage to Scott's Hill Market and some minor damage to homes primarily along the west side of Pandy Ann Ln. There

			were several trees uprooted along the road. The tornado lifted as it entered the woods near the end of Pandy Ann Ln.
WALKERS STORE	9/5/2019	EF0	Tornado formed along Shaw Highway NE of Rocky Point. The tornado crossed the NE Cape Fear River and caused minor tree damage along New Rd. The tornado moved NW causing minor roof damage and some snapped trees along Highway 117 in the St. Helena area. The tornado approached the southside of Burgaw causing tree damage on Worth Beverage Dr. Additional tree damage was found up to West Clark St. The tornado lifted near Pender Memorial Park.
WHITE STOCKING	9/5/2019	EF0	A tornado was likely already occurring as it moved into the old Maple Hill Rd area south of Highway 53 causing trees to be snapped. Prior to this time, it was likely over the Holly Shelter swamp area which was inaccessible during our damage survey. The tornado moved WNW, crossing Shaw Highway near Old Blakes Bridge Rd. causing some minor tree damage. The tornado then crossed Highway 53 causing additional tree damage. The tornado finally lifted near Croomsbridge Rd north of Highway 53 in the Shelter Neck area.

TABLE H.12: WINTER STORM EVENTS (2000-2019)

Date	Description
Brunswick County	
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about two tenths of an inch, and sleet accumulations along the coast were about a half inch. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about two tenths on an inch, and sleet accumulations in the county ranged from a half inch to nearly an inch. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.
2/11/2014	Freezing rain began falling the morning of February 11th, with around a quarter inch of ice accumulation reported at Sunset Beach. Driving was treacherous, with numerous power outages reported.
2/11/2014	Freezing rain began falling the morning of February 11th, with around a quarter inch of ice accumulation reported by late that afternoon. Driving was treacherous, with numerous power outages reported. Some residents stayed overnight at emergency shelters.
1/3/2018	Snow began falling by afternoon on Jan 3rd. Two inches of snow had fallen by|9 pm, and the totals for the event ranged from one half inch to four inches with most of the snow falling on the northeast portion of the county. The low pressure responsible for the winter weather bombed off the east coast, dropping 24 millibars in twenty-four hours. Record cold preceded and followed the event, lasting until Jan 8th.
New Hanover County	
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about a half inch, and sleet accumulations along the coast were about an inch. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about a half inch, and sleet accumulations in the county ranged from one to two inches. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.
2/11/2014	Freezing rain began falling the morning of February 11th, with a tenth of an inch of ice accumulation reported by late that afternoon. Driving was treacherous, with numerous power outages reported.

Date	Description
2/11/2014	Freezing rain began falling the morning of February 11th, with over a half inch of ice accumulation reported at the National Weather Service office in Wilmington. Driving was treacherous, with numerous power outages reported. The police department reported trees and branches down over much of Wilmington. Some residents stayed overnight at emergency shelters.
1/3/2018	Snow began falling by afternoon on Jan 3rd. Two inches of snow had fallen by|11 pm, and the total snow for the event was about an inch along the coast. A quarter of an inch of ice was also reported in Kure Beach. The low pressure responsible for the winter weather bombed off the east coast, dropping 24 millibars in twenty-four hours. Record cold preceded and followed the event, lasting until Jan 8th.
1/3/2018	Snow began falling by afternoon on Jan 3rd. Two inches of snow had fallen by|11 pm, and the totals for the event ranged from one to four inches with the heaviest accumulations to the north. A tenth of an inch of ice was also reported southwest of Wilmington. The low pressure responsible for the winter weather bombed off the east coast, dropping 24 millibars in twenty-four hours. Record cold preceded and followed the event, lasting until Jan 8th.
Onslow County	
1/3/2002	Eastern North Carolina was blanketed by ice and snow beginning later in the afternoon on January 3rd. Snowfall continued for several hours and ended over much of the area by 4am on the 4th. Mainland locations received 4 to 6 inches of snow while along the outer banks only a trace to an inch of snow was recorded from Manteo to Cape Hatteras, mainly due to gusty winds. On the Island of Ocracoke, four inches of snow was recorded within the village.
1/23/2003	A major winter storm affected eastern North Carolina on January 23, 2003. The storm dumped the highest amounts of snow east of highway 17 across the area known as the Outer Banks, where 8 to 12 inches of snow fell with isolated amounts up to 14 inches, including the counties of eastern Carteret, Dare and, and Hyde counties. This was the largest one-day snowfall on the Outer Banks in over a decade. The greatest storm total snowfall occurred on December 23rd and 24th in 1989. Snowfall amounts from 4 to 8 inches fell across central sections of the county warning area including Craven, Pamlico, Beaufort, and Tyrrell counties. Other western counties received 2 to 4-inch snowfall amounts.
1/25/2004	A winter storm produced up to 2-inch ice accumulations mainly across the coastal plains of eastern North Carolina.
1/26/2004	A winter storm caused up to one half inch ice accumulations mainly across the coastal plains of eastern North Carolina during the night.
12/26/2004	Another winter storm affected parts of eastern North Carolina on the 26th with a second round of winter weather. A wintry mix of precipitation occurred along and west of Highway 17. Portions of Duplin, Lenoir, Greene, Pitt, Martin, and Washington counties received up to 5 inches snow. Freezing rain resulted in up to one quarter inch ice accumulations in western Beaufort, Craven, Jones, Onslow, and Duplin counties.
1/28/2014	A mix of sleet and freezing rain began during the morning of January 28th and continued through the early morning hours of January 29th before briefly ending as light snow. There was up to 0.25 inches of freezing rain early, then around 2 inches of sleet. Roads were icy for several days during and after the event.
2/11/2014	Widespread freezing rain, sleet and snow developed during the morning hours of February 11th and continued much of the day. Ice accumulated 0.25 to 0.5 inch across the southern and eastern parts of the county. Over the far northwest parts of the county snow accumulated 3 to 4 inches. The freezing rain and snow gradually changed to rain on February 12th.
1/3/2018	Light freezing rain changed to snow during the evening of January 3rd and accumulated 3 to 5 inches county wide by the early morning hours of January 4th. The snow and ice produced widespread hazardous travel conditions. A weather-related traffic fatality was reported in Onslow County near the Pender County line as motorist drove into a canal.
Pender County	
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about four tenths of an inch, and sleet accumulations along the coast were about one and a half inches. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.

Date	Description
1/28/2014	Freezing rain began falling the afternoon of Jan 28th, changed over to mostly sleet in the evening and overnight hours, and tapered off to flurries the morning of the 29th. Total ice accumulations were about a quarter inch, and sleet accumulations in the county were about two and a half inches. Due to the nature of the precipitation, power outages were isolated, however driving was treacherous. Numerous traffic accidents were reported as well as injuries due to slips and falls.
2/11/2014	Freezing rain began falling the morning of February 11th, with a tenth of an inch of ice accumulation reported near the coast. Driving was treacherous, with numerous power outages reported.
2/11/2014	A mixture of snow, freezing rain and sleet began falling the morning of February 11th, with over an inch of frozen precipitation reported at Watha. Driving was treacherous, with 3700 residents without power. Some residents stayed overnight at emergency shelters. One man was killed when an ice-laden tree branch fell on him outside his home on Hopes Path Road in Rocky Point. Six people were taken to the hospital and treated for carbon monoxide. They were trying to heat their home with a charcoal grill.
1/3/2018	Snow began falling by afternoon on Jan 3rd. Two inches of snow had fallen by 8:00 pm, and the totals for the event ranged from three to five inches. The low pressure responsible for the winter weather bombed off the east coast, dropping 24 millibars in twenty-four hours. Record cold preceded and followed the event, lasting until Jan 8th.
1/3/2018	Snow began falling by afternoon on Jan 3rd. Two inches of snow had fallen by 8 pm, and the totals for the event ranged from three to five inches. The low pressure responsible for the winter weather bombed off the east coast, dropping 24 millibars in twenty-four hours. Record cold preceded and followed the event, lasting until Jan 8th.